DEER BIOLOGICAL DATA

Deer Stakeholder Group Meeting

Presented by: Andy Lindbloom, Senior Big Game Biologist

Biological Data

Mule Deer and White-tailed Deer

- Herd Composition
- Reproduction
- Aerial surveys
- Harvest

- Deer Research
- Survival studies

Herd Composition Surveys

- Sept and Oct
- Random ground counts
- Age and sex ratios

- 2015
  - Classified 20,075 deer
  - WTD = 15,028
  - Mule Deer = 5,047

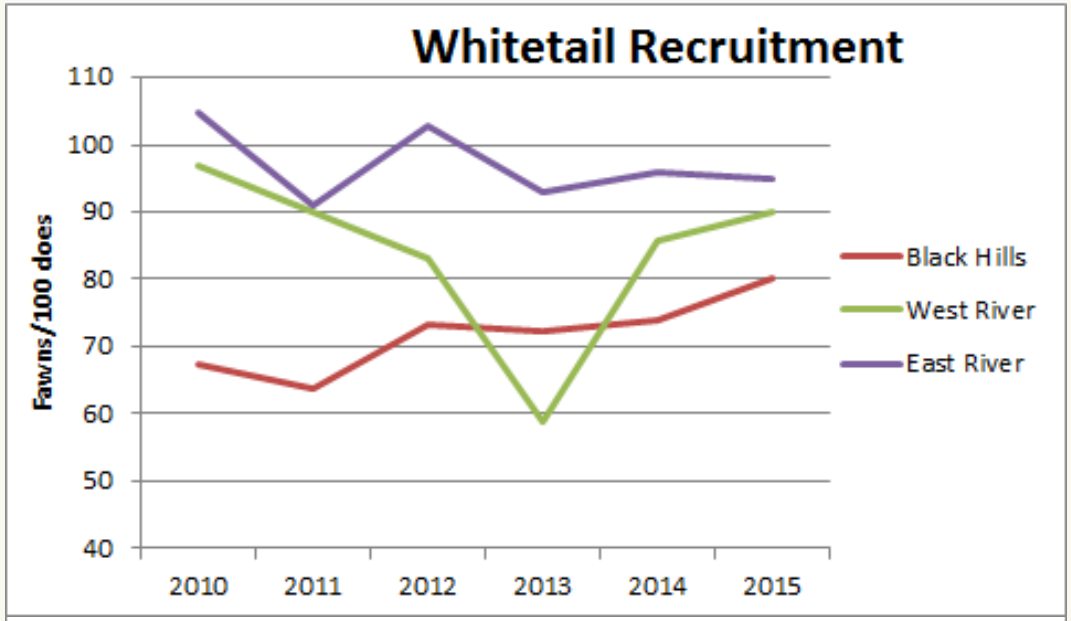
2015 Herd Composition Survey

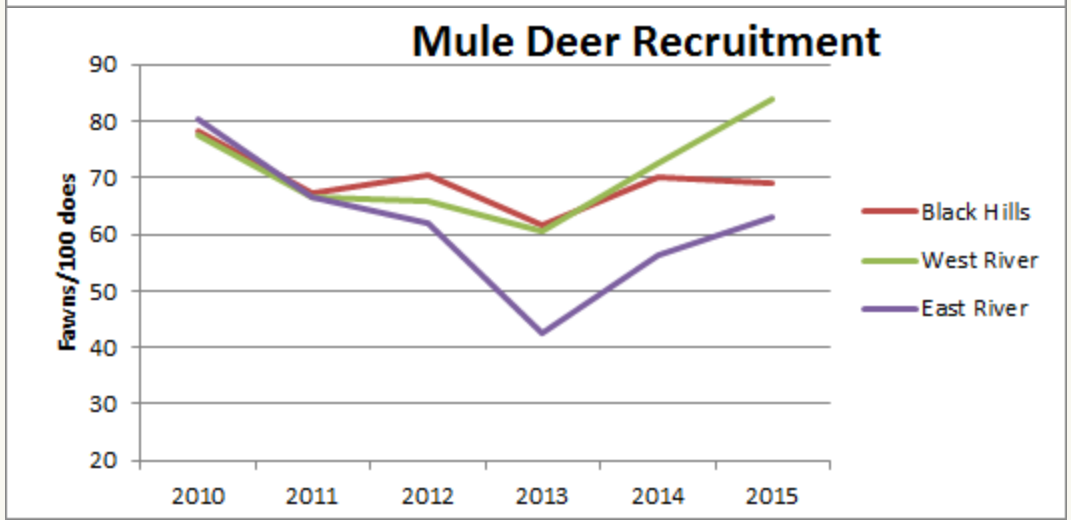
2015 Fall Deer Classification Survey Summary

	White-tailed Deer						Mule Deer					
	# Fawns	# Does	# Bucks	Total	F:100D	B:100D	# Fawns	# Does	# Bucks	Total	F:100D	B:100D
Region 1	1334	1422	340	3096	94	24	1350	1551	565	3466	87	36
Region 2	849	1050	273	2172	81	26	443	651	243	1337	68	37
Region 3	1485	1375	532	3392	108	39				-	-	-
Region 4	2156	2375	700	5231	91	29				-	-	-
Prairie	5824	6222	1845	13891	94	30	1793	2202	808	4803	81	37
West River	1753	1939	460	4152	90	24	1633	1950	737	4320	84	38
East River	4071	4283	1385	9739	95	32	160	252	71	483	63	28
Black Hills	448	563	126	1137	80	22	78	113	53	244	69	47
STATEWIDE	**6,272**	**6,785**	**1,971**	**15,028**	**92**	**29**	**1,871**	**2,315**	**861**	**5,047**	**81**	**37**

Fawn:100Doe	**92**	***white-tailed deer***
	81	***mule deer***
Buck:100Doe	**29**	***white-tailed deer***
	37	***mule deer***

Age Ratios



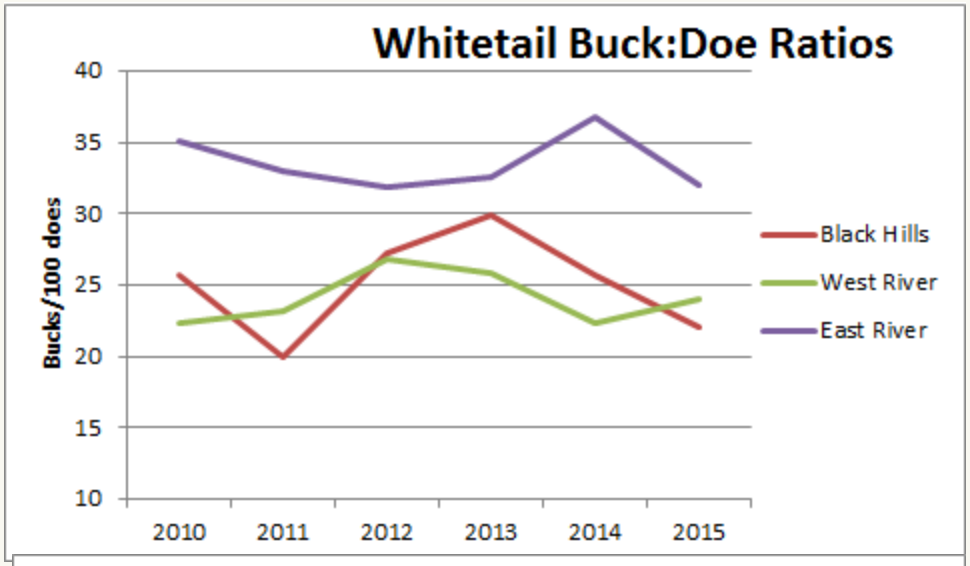


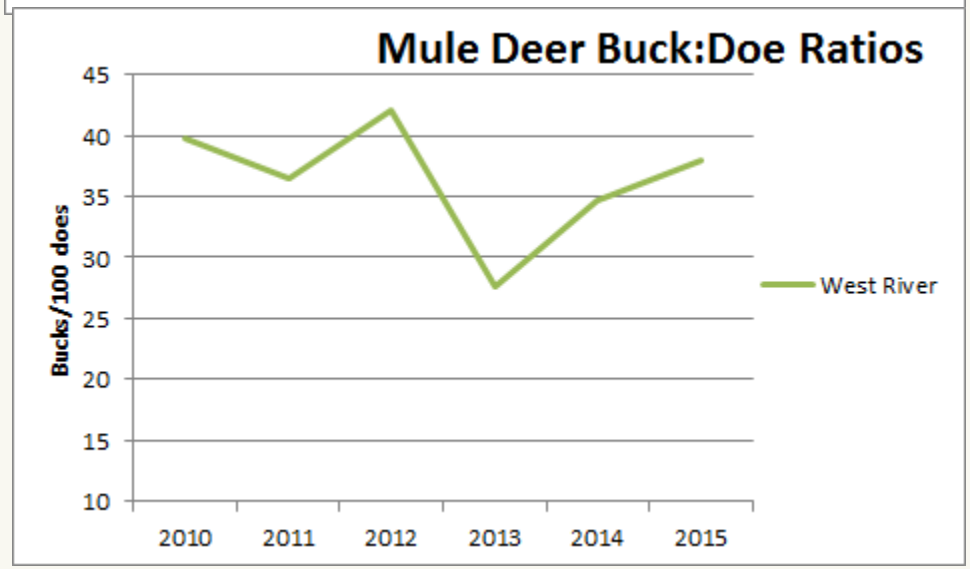
- **Fall Recruitment**
- White-tailed deer (92)

  Fawns per 100 does (95% CI)
  - East River = 95 (91-99)
  - West River = 90 (85-96)
  - Black Hills = 80 (70-90)
- Mule Deer (81)

  Fawns per 100 does (95% CI)
  - East River = 63 (52-77)
  - West River = 84 (78-89)
  - Black Hills = 69 (52-92)

Sex Ratios





- **Herd Composition**

- White-tailed deer (29)

  Bucks per 100 does (95% CI)
  - East River = 32 (30-34)
  - West River = 24 (21-26)
  - Black Hills = 22 (18-27)

- Mule Deer (37)

  Bucks per 100 does (95% CI)
  - East River = 28 (22-37)
  - West River = 38 (35-41)
  - Black Hills = 47 (34-65)

Reproduction surveys

- Methods
  - Roadkill evaluation
  - Ultrasonography

WHITETAILS

				Pregnancy Rate				Fetus average				
Area	**Years**	**Sample**	**Method**	**Fawns**	**Yearlings**	**Adults**	**Overall**	**Fawns**	**Yearlings**	**Adults**	**Overall**	
East river	1977-89	1060	roadkill	58%	88%	96%	77%	0.74	1.53	1.89	1.39	
Reg3 and 4	2012-13	176	roadkill	33%	83%	95%	75%	0.43	1.45	1.82	1.35	
Reg4	2015	55	ultrasound	-	100%	98%	98%	-	1.60	1.98	1.94	*only 5 yearlings, no fawns*
West river	1977-89	154	roadkill	37%	79%	96%	75%	0.44	1.28	1.85	1.19	**44 fawns*
Black Hills	1977-89	373	roadkill	0%	80%	93%	78%	0.00	1.08	1.49	1.22	**40 fawns*
Black Hills	2015	51	roadkill	33%	100%	76%	69%	0.33	1.33	1.12	0.98	**12 fawns*

MULE DEER

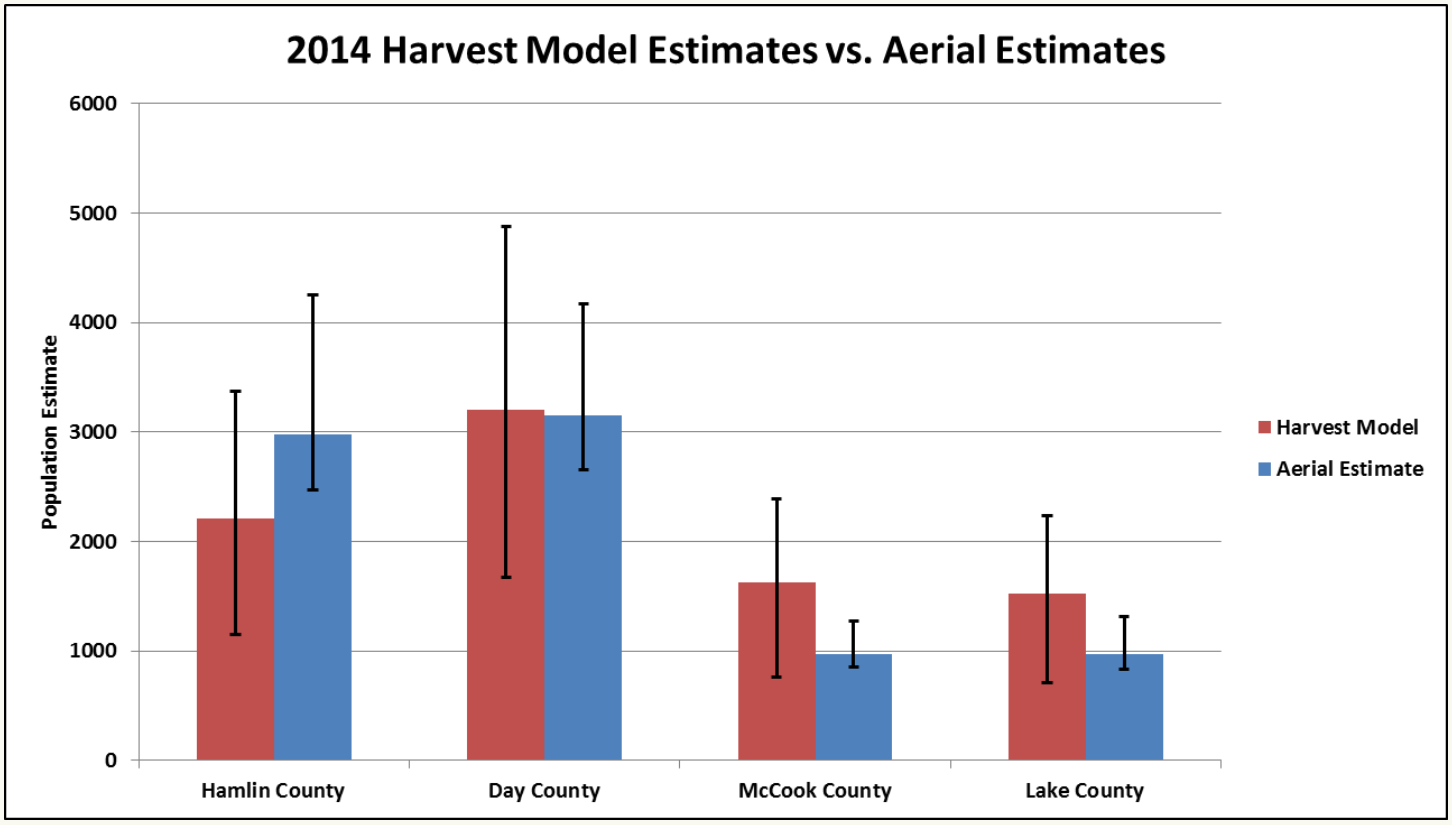
				Pregnancy Rate				Fetus average				
Area	**Years**	**Sample**	**Method**	**Fawns**	**Yearlings**	**Adults**	**Overall**	**Fawns**	**Yearlings**	**Adults**	**Overall**	
West River	1977-89	112	roadkill	0%	91%	99%	81%	0.00	1.35	1.83	1.64	**18 fawns*
Badlands	2015	50	ultrasound	-	100%	100%	100%	-	2.00	1.83	1.83	*no fawns, only 1 yearling*
Missouri Rive	2015	48	ultrasound	-	100%	95%	96%	-	1.67	1.76	1.75	*no fawns*

Aerial Deer Surveys

- SDGFP/SDSU have developed survey sightability models for white-tailed deer and mule deer
  - Fixed-wing surveys
  - Mule deer model limited applicability due to topography
  - Whitetail model useable in most hunting units east of the Missouri River
- Select areas, rotate
- Higher detection probability with 100% snow cover
- **No surveys in 2014/15**
- **No surveys in 2015/16**

2013/14 Aerial Survey Results

- Flew 4 deer units in eastern South Dakota
  - Utilized the winter model developed in Clark County
  - Compared Department population model estimates



South Dakota Deer Seasons

- Firearm
  - **West River Deer**
    - Landowner-Own-Land
    - Free Antlerless
    - Special Buck
  - **East River Deer**
    - Landowner-Own-Land
    - Free Antlerless
    - Special Buck
  - **Black Hills Deer**
- Archery
- Muzzleloader
- Youth and Mentored
- National Wildlife Refuge

- **Provides a lot of hunter opportunity**
  - ~91,000 successful deer applicants in 2014
  - ~9,000 successful applicants for all other big game species combined (excluding turkey)

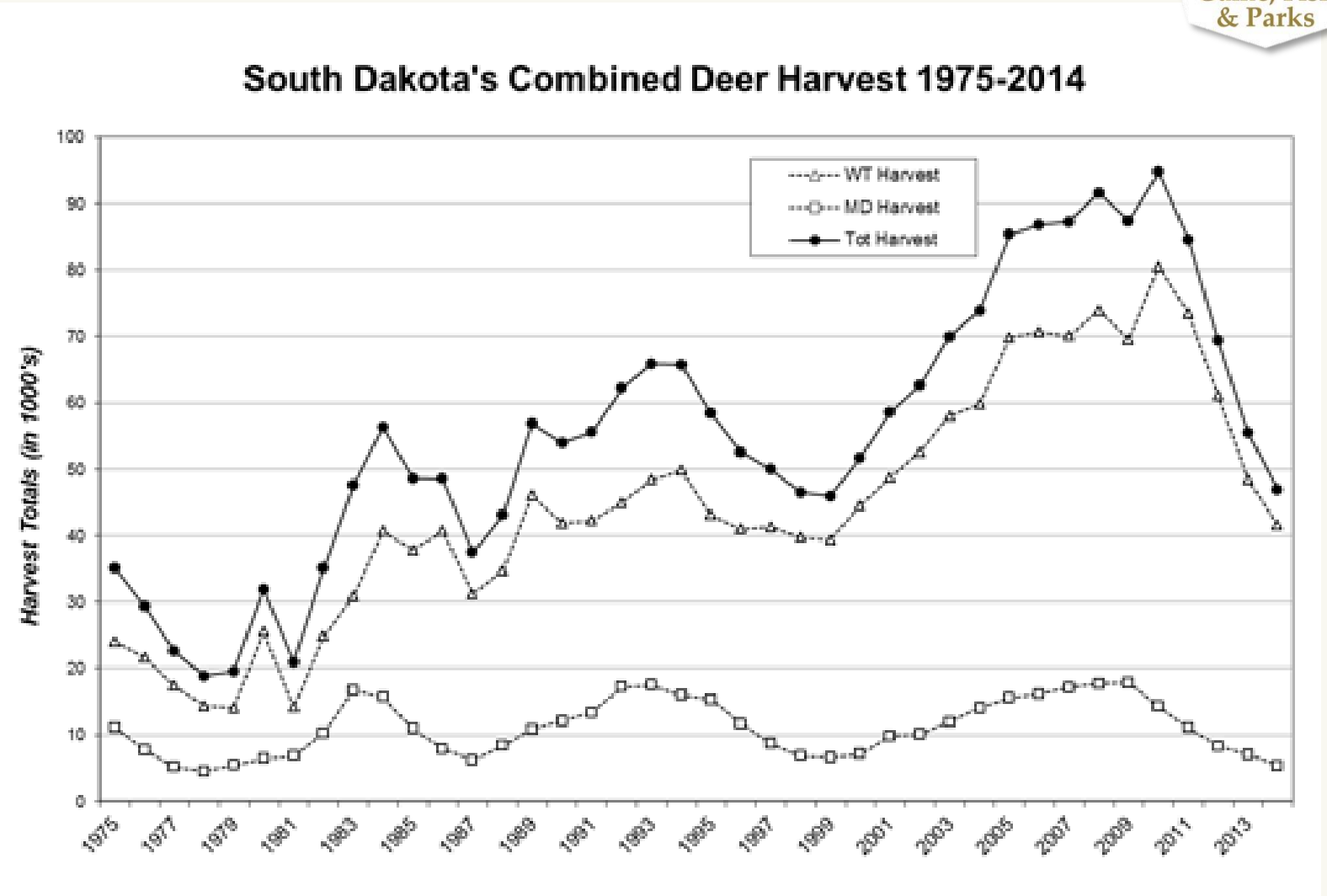
2014 Deer Harvest

- Statewide ~ 46,900
  - 2013 ~ 56,100

- White-tailed deer
  - Total ~41,500 harvested *(49,100 in 2013)*
    - ~27,000 bucks *(25,600 in 2013)*
    - ~14,500 does *(23,500 in 2013)*
- Mule deer
  - Total ~ 5,400 mule deer *(7,000 in 2013)*
    - ~4,400 bucks *(4,300 in 2013)*
    - ~1,000 does *(2,700 in 2013)*

- Recreation days ~ 487,600
- Unique deer license holders ~ 58,400

South Dakota Combined Deer Harvest
1975-2014



Deer Trend Overview

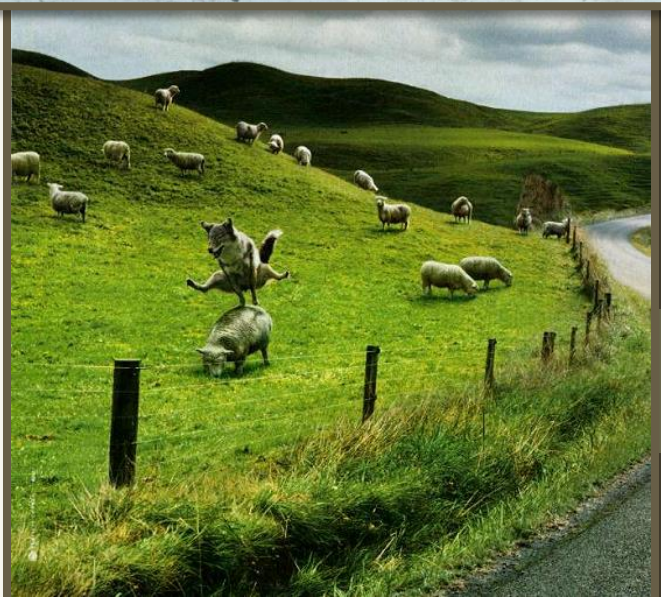
- Record deer populations
- Increased depredation
- Liberal harvest regulations
- Record harvests

How to increase harvest?

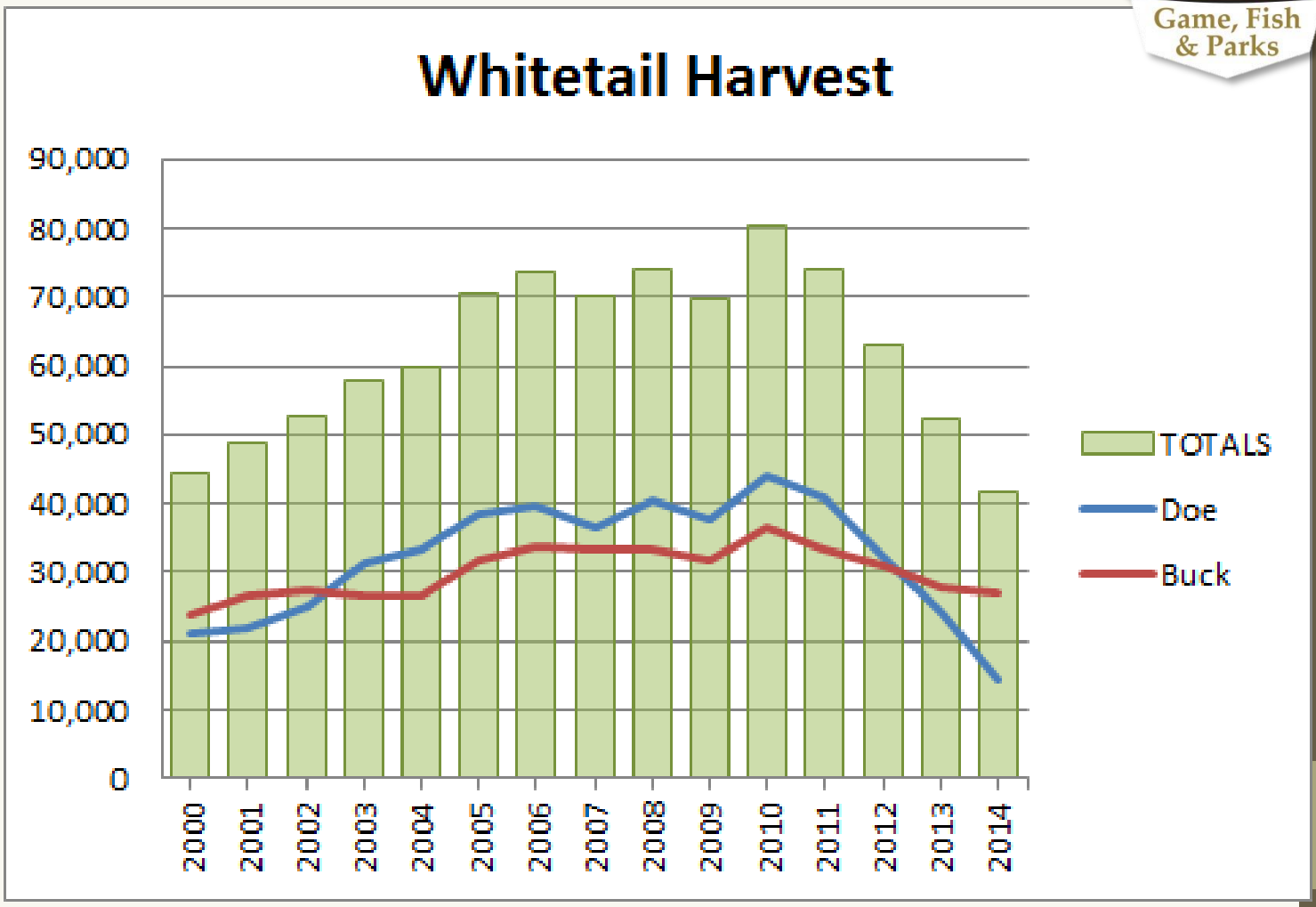
- Increased license numbers
- Increased 2-tag and added 3-tag licenses (3rd tag free)
- Changed all archery, youth deer, and muzzleloader licenses from limited deer management unit allocation to statewide and unlimited seasons
- Reduced antlerless license fees
- Provide over-the-counter access to unsold licenses
- Added antlerless season extensions (during pronghorn, after regular, January) and allowed antlered tag conversion
- Free deer donations to Sportsmen Against Hunger

Deer Trend Overview

- Severe winters (2008-2011)
  - Increase overwinter mortality
  - Decrease recruitment
- Record drought (2012)
- Predator impacts…?
  - Increasing lion population
  - Increasing coyote population?
- Substantial habitat loss
  - Over 3.4 million acres of grassland in eastern Dakota's lost from 2001 to 2010 (preliminary comparison of 2001 National Land cover data vs. 2010 USDA Cropland data layer)
    - not since 1920s and 1930s has grassland conversion taken place at this rate
  - Shelterbelts, wetland cover losses
- Record EHD (2011, 2012)

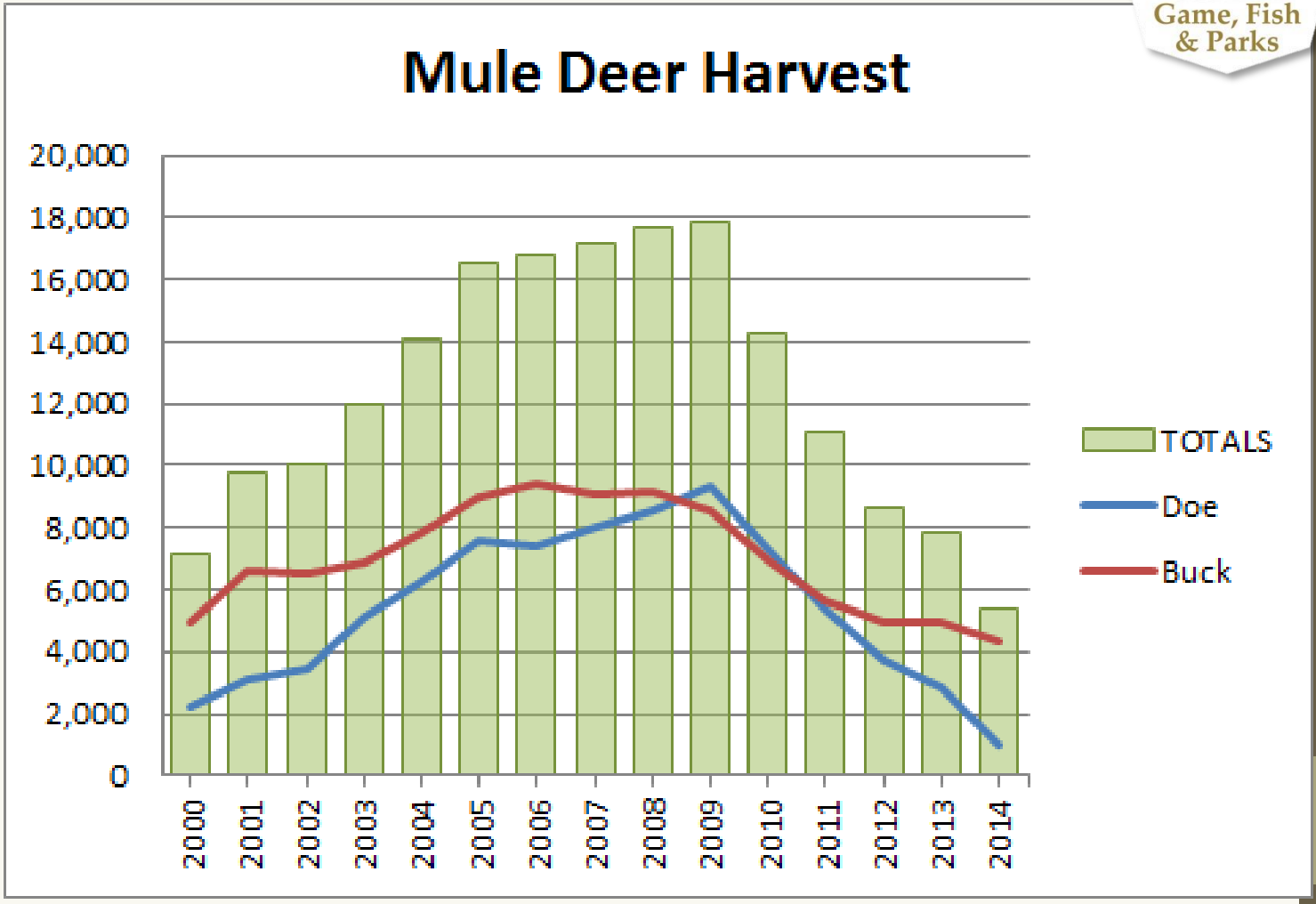


White-tailed Deer Harvest



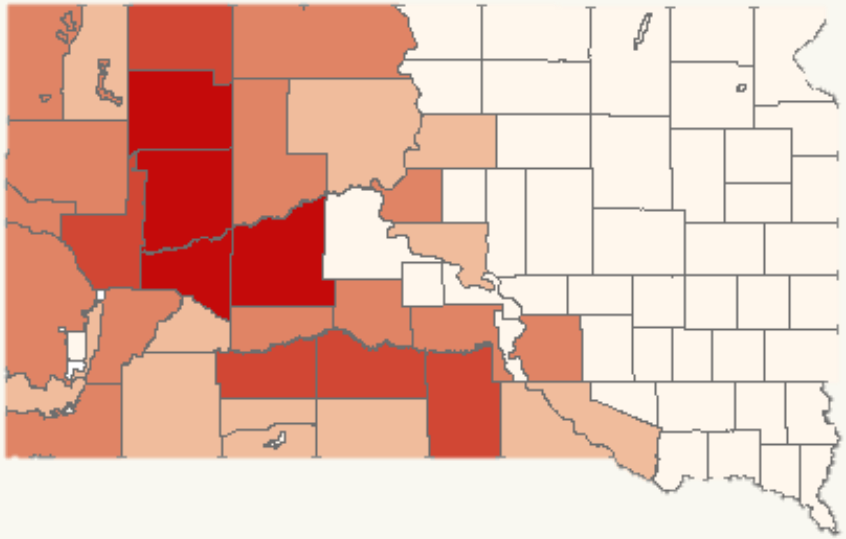
- *Antlerless = 14,553 Antlered = 26,972 Total = 41,525*

Mule Deer Harvest



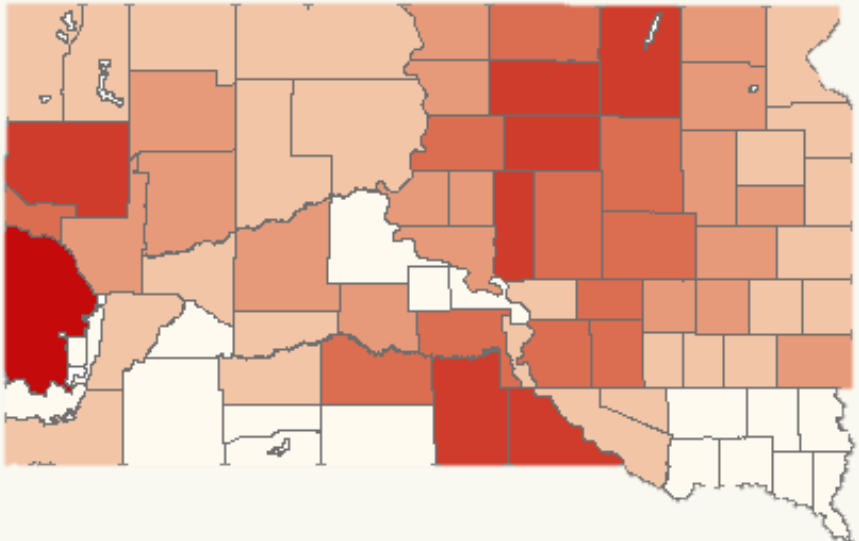
- *Antlerless = 996* *Antlered = 4,353* *Total = 5,349*

2014 Harvest Maps



Total Harvest – Mule Deer

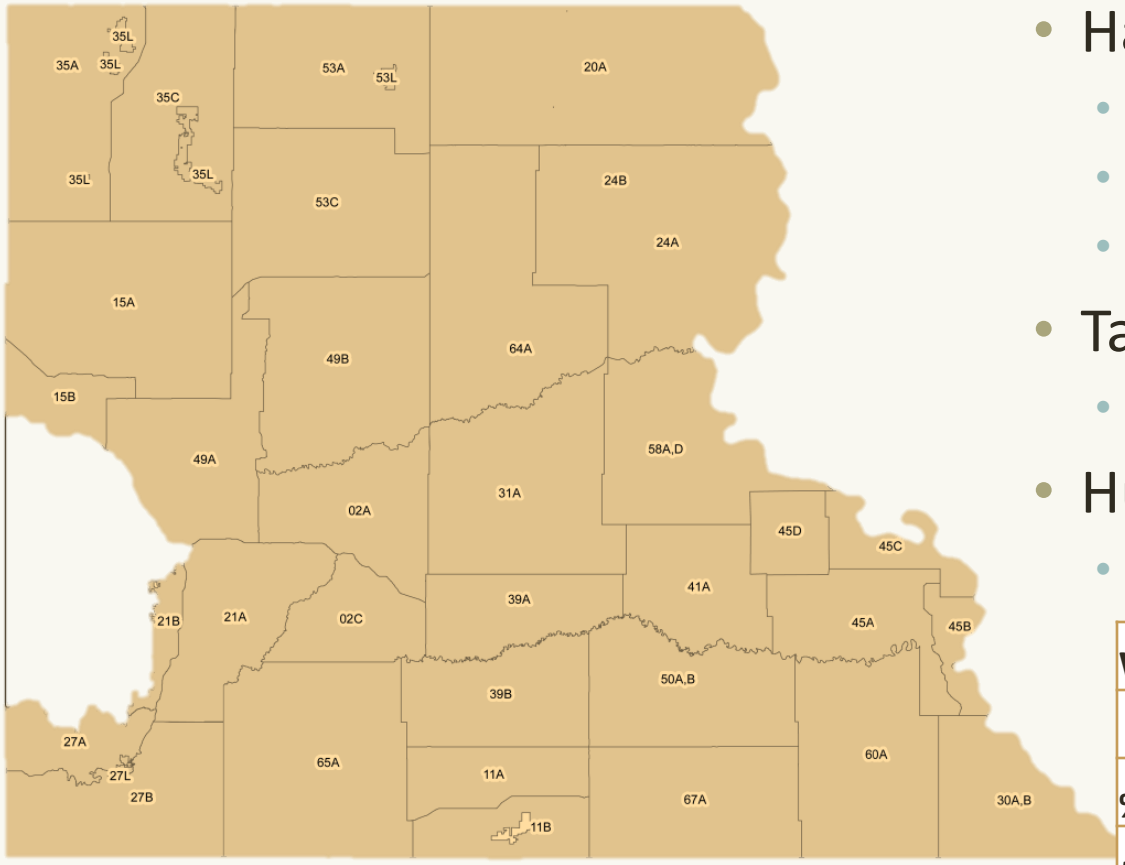
0 - 16
17 - 44
45 - 86
87 - 151
152 - 261



Total Harvest – White-tailed Deer

6 - 104
105 - 236
237 - 428
429 - 703
704 - 1373
1374 - 2351

West River Deer Firearm 2014



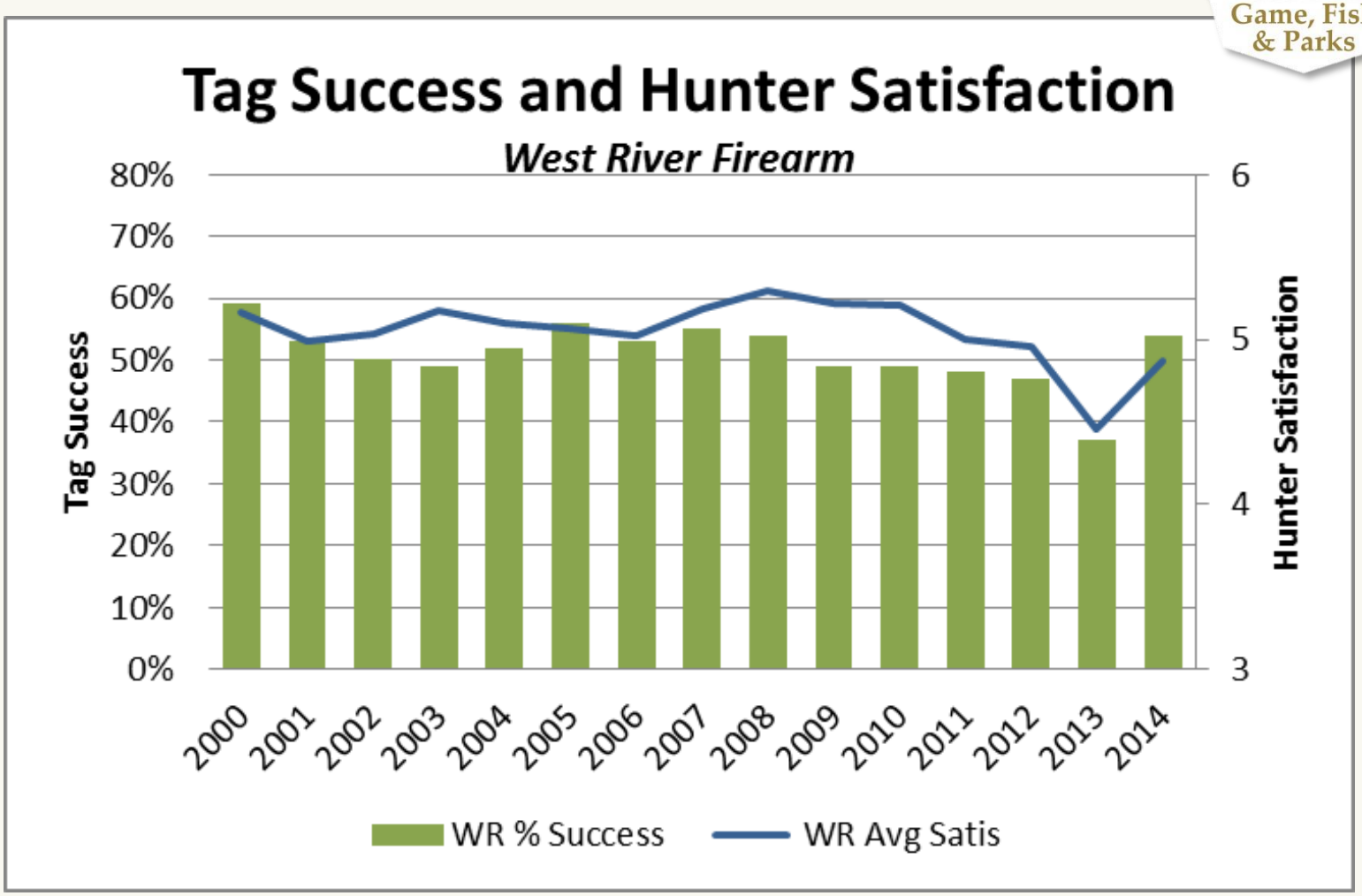
- Harvest = 11,632
  - 16,900 in 2013
  - 22,500 in 2012
  - Peak ~35,000 in 2009
- Tag Success = 54%
  - 36% in 2013
- Hunter Success = 57%
  - 55% in 2013

WRDeer Antlerless Harvest by date

	Nov 1 - 30	Dec 27 - Jan 4	Total
%	98%	2%	
#	2,823	64	2,887

West River Deer 2014

West River Deer 2014

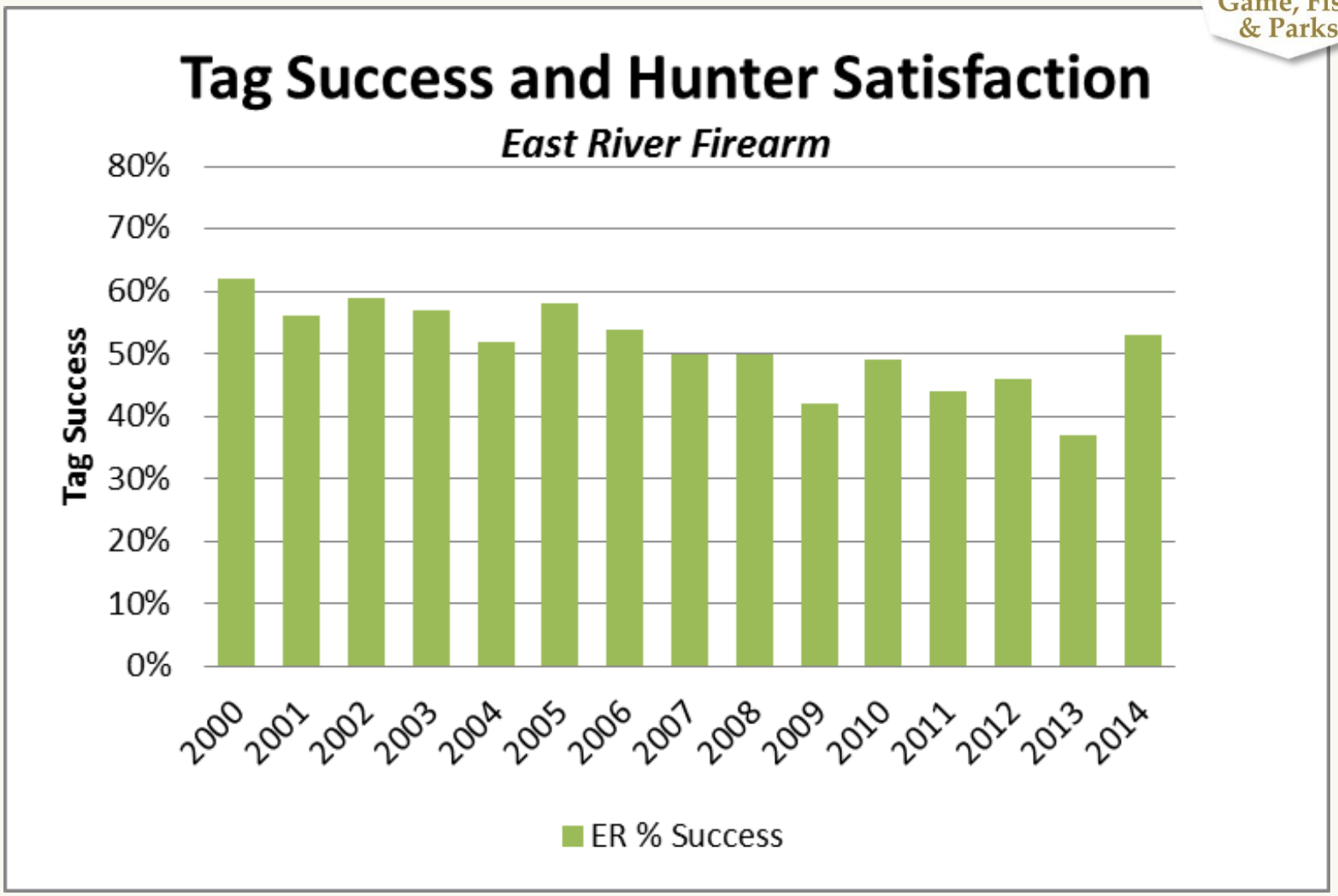


East River Deer Firearm 2014

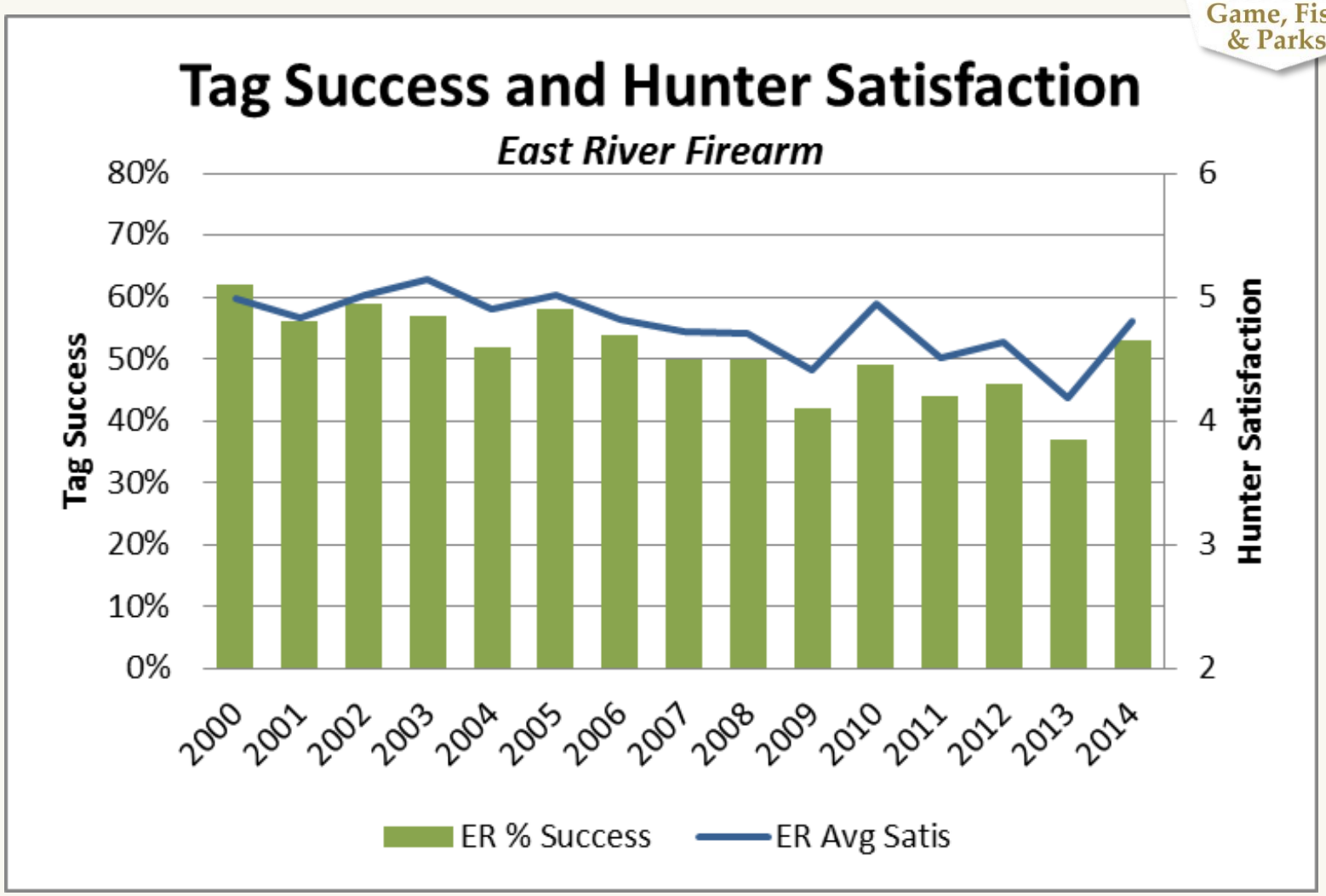
- Harvest = 15,845
  - 19,210 in 2013
  - 25,900 in 2012
  - Peak ~ 43,000 in 2005
- Tag Success = 52%
  - 38% in 2013
- Hunter Success = 55%
  - 45% in 2013

ERDeer Antlerless Harvest by date			
	Nov 22 - Dec 7	Dec 27 - Jan 4	Total
%	95%	5%	
#	6,256	340	6,596

East River Deer 2014

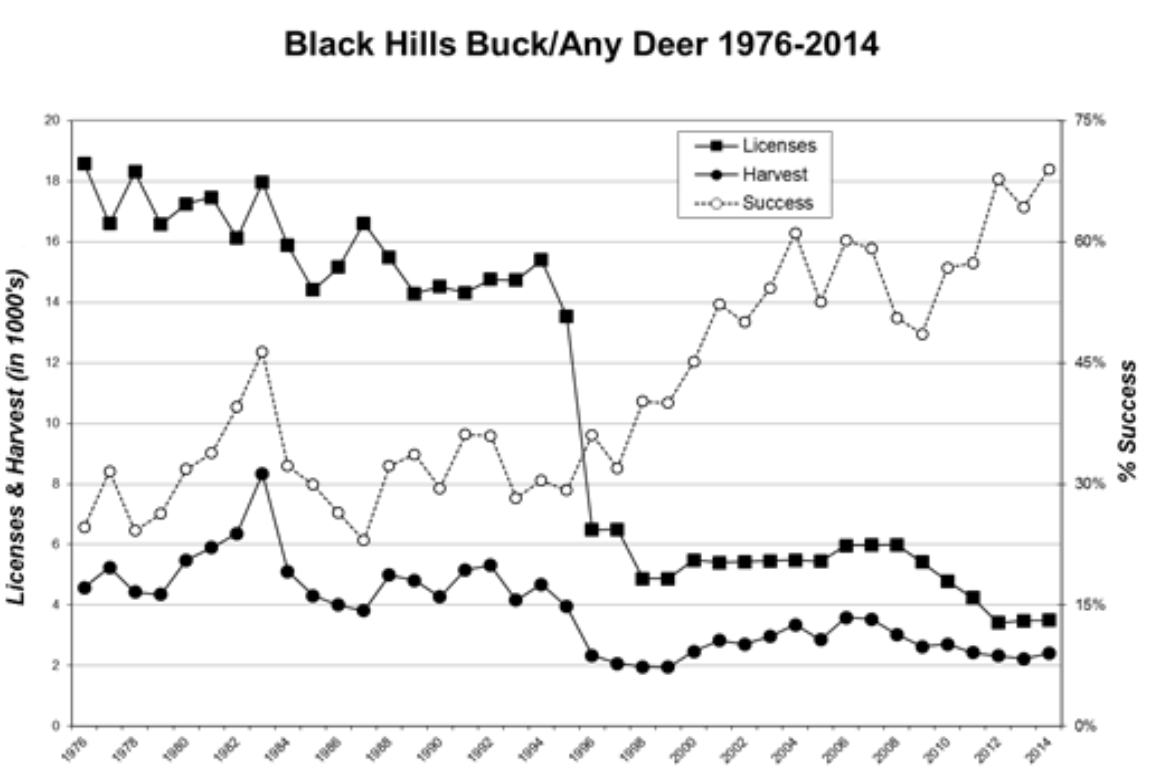


East River Deer 2014

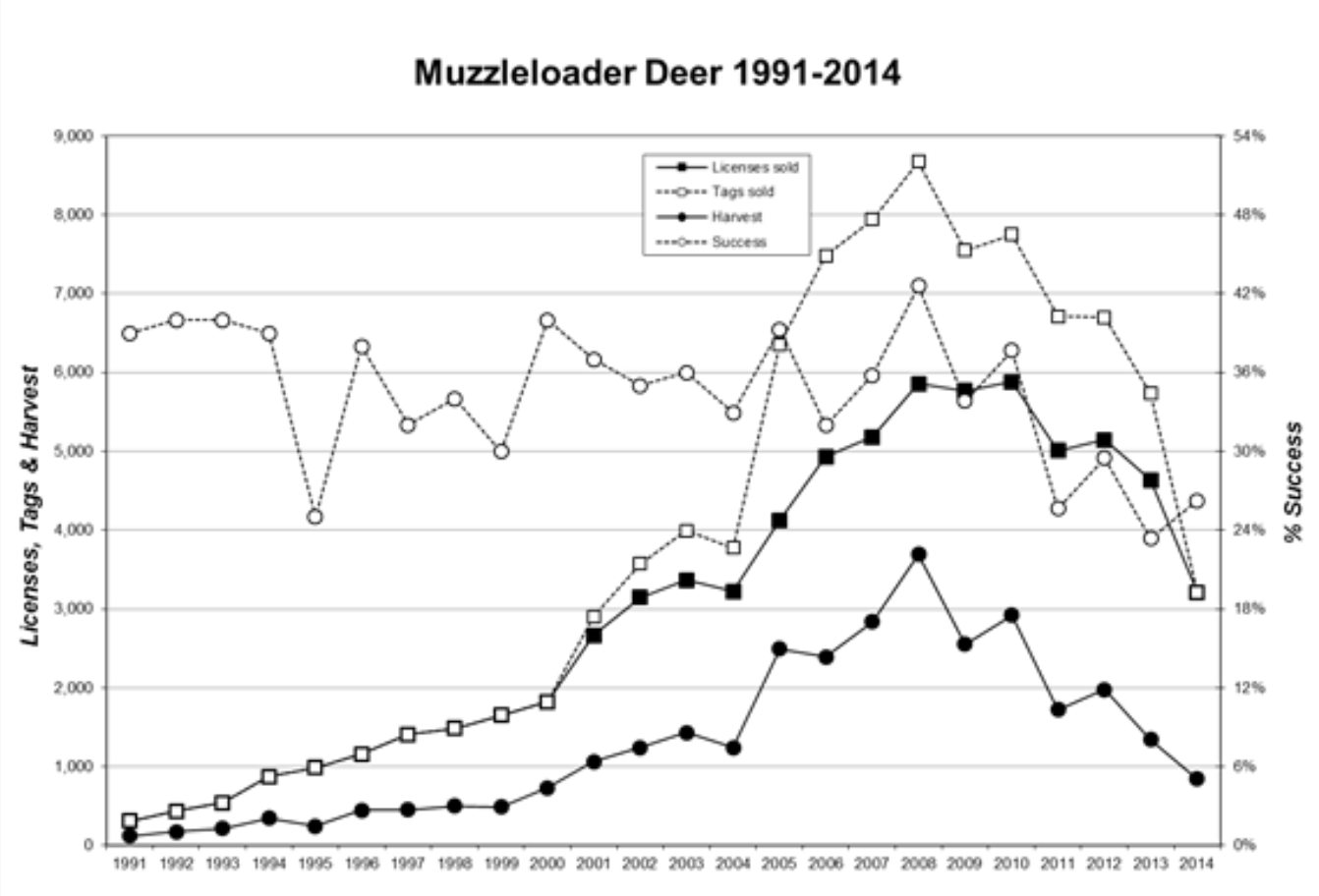


Black Hills Deer - 2014

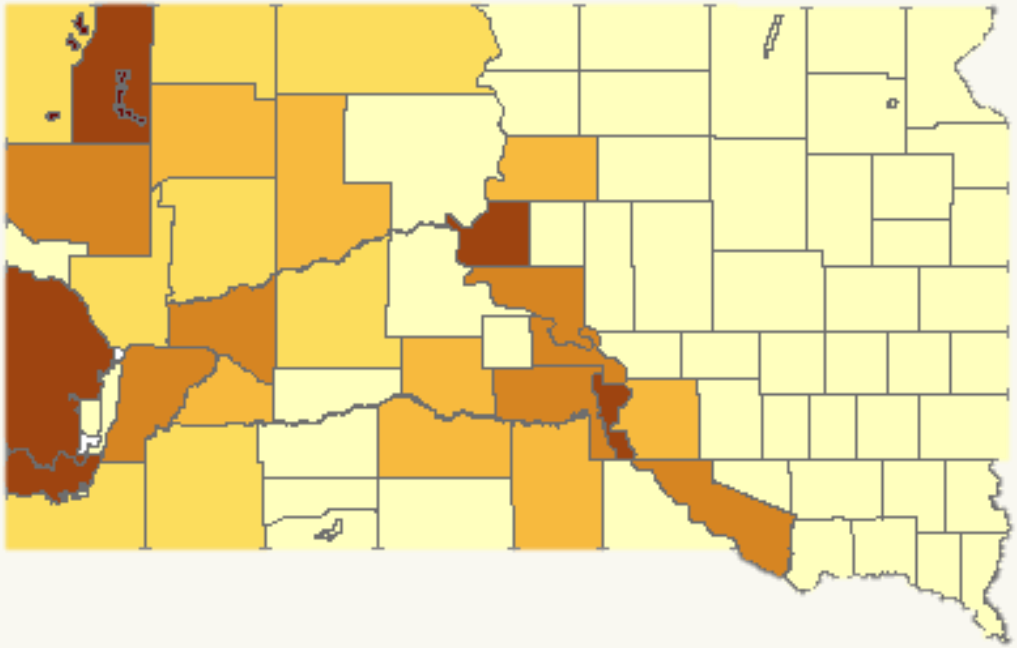
- Success = 69%
  - 64% in 2013
- BH Harvest = 2,410
  - 2,294 in 2013
- Total Harvest = 3,631
  - 1221 deer from other seasons (34% of total)
  - Youth = 271
  - Mentored = 186
  - Archery = 713
  - Muzzleloader = 51



Muzzleloader 2014



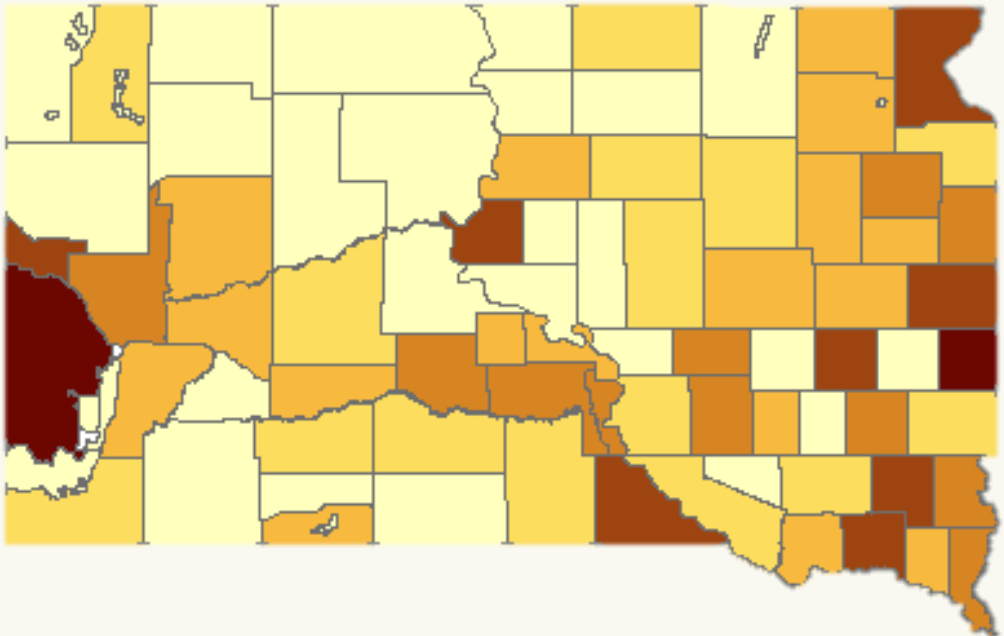
- Success = 26%
  - 20% in 2013
- Harvest ~ 840
  - 1,350 in 2013



Muzzleloader Mule Deer Buck

- 0.000
- 0.001
- 0.002
- 0.003 - 0.004
- 0.005 - 0.008
- 0.009 - 0.053

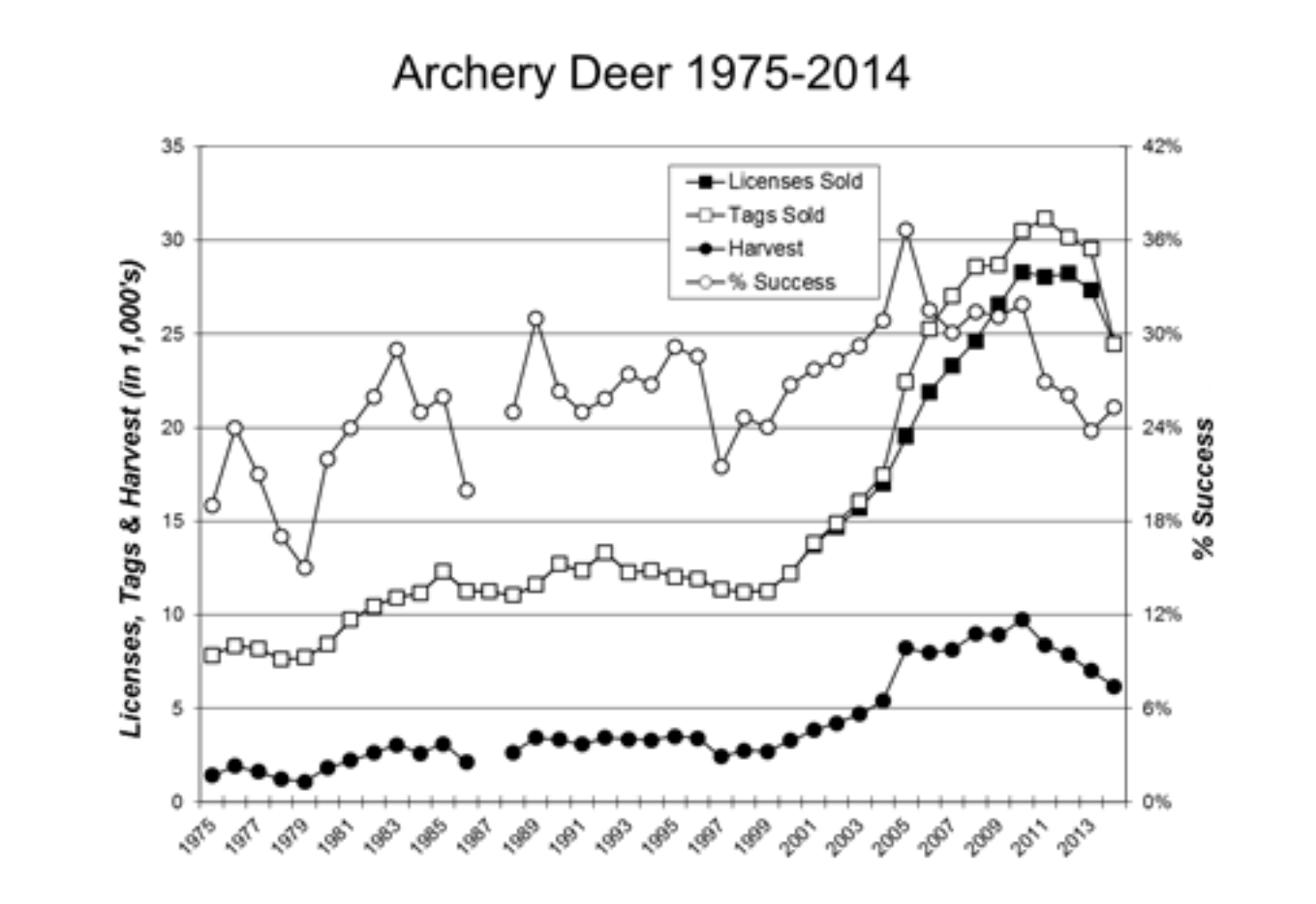
2014 Harvest Densities (harvest/sq mile)



Muzzleloader Whitetail Buck

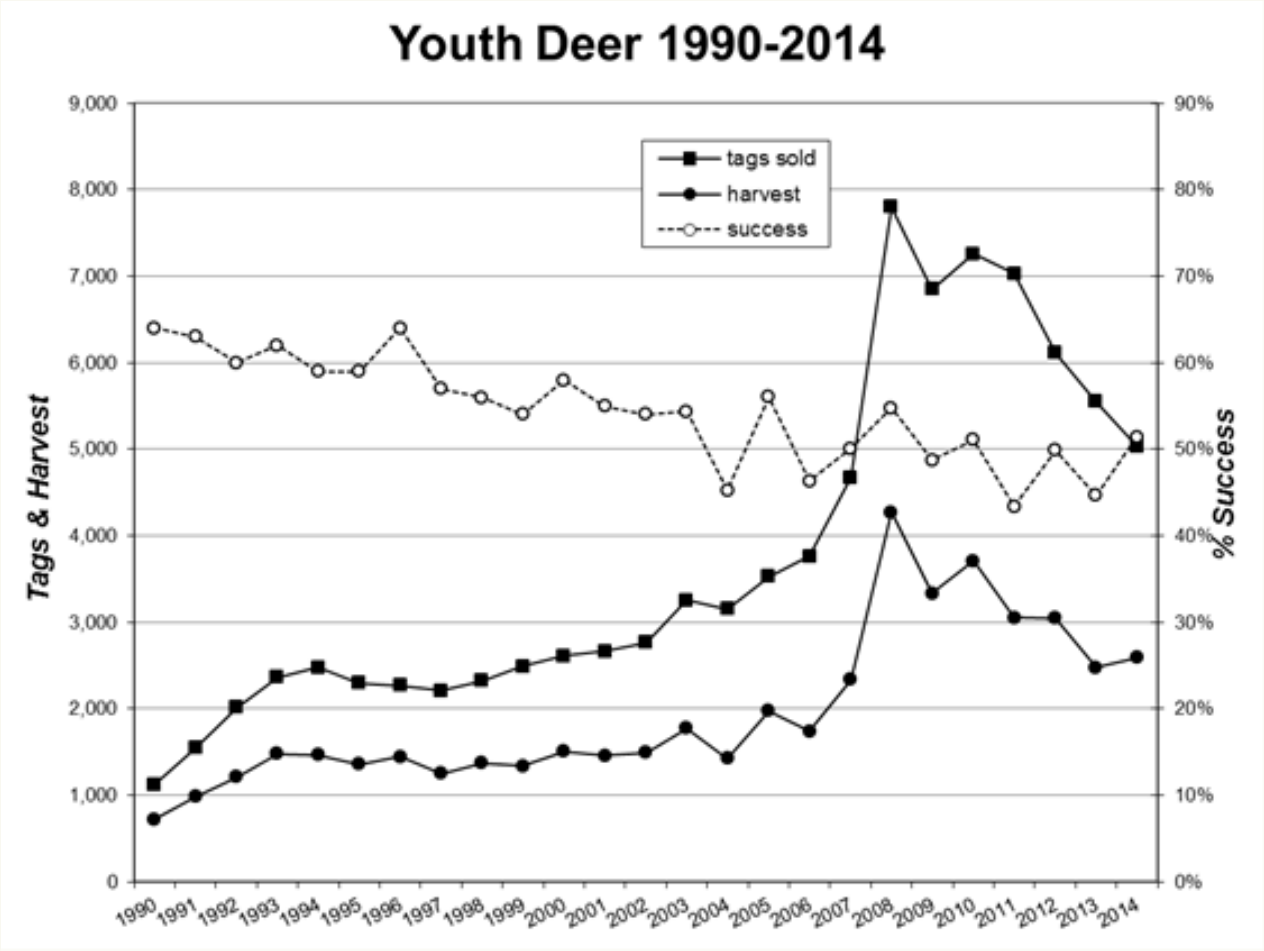
- 0.000 - 0.001
- 0.002
- 0.003 - 0.004
- 0.005 - 0.006
- 0.007 - 0.009
- 0.010 - 0.013

Archery Deer 2014



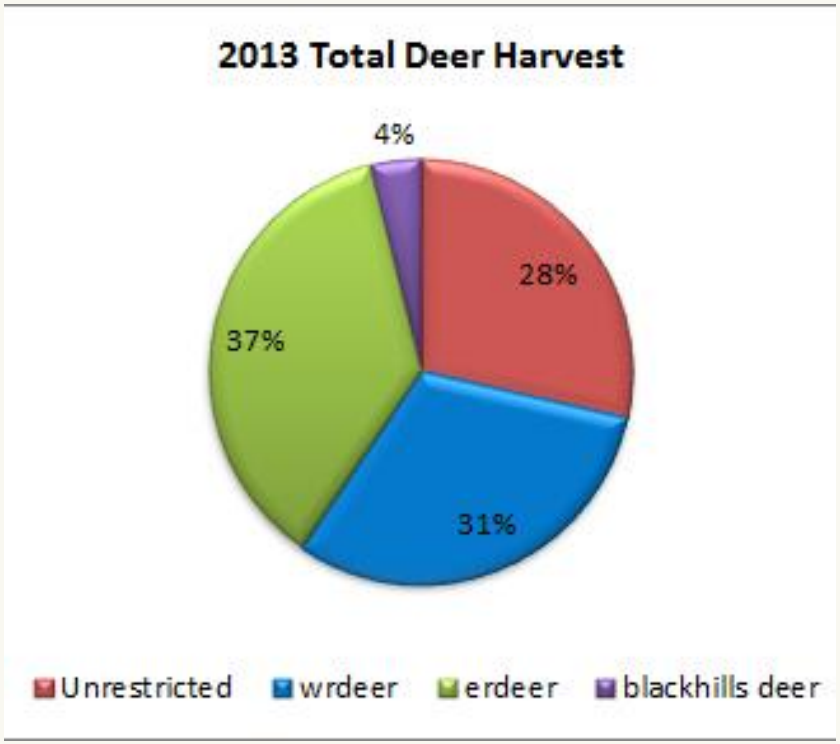
- Success = 25%
  - 25% in 2013
- Harvest ~ 6,200
  - 7,300 in 2013

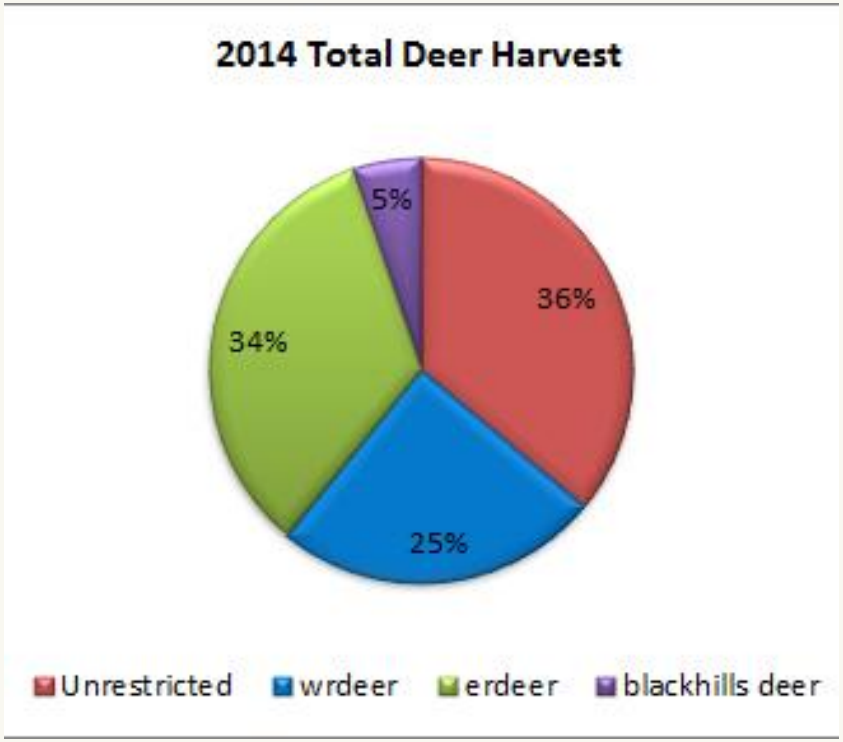
Youth Deer 2014



- Success = 51%
  - 45% in 2013
- Harvest ~ 2,600
  - 2,500 in 2013
- Mentored – 1,600 deer and 52% success

Total Deer Harvest





Statewide harvest ~ 46,900

Deer Research Updates

South Dakota

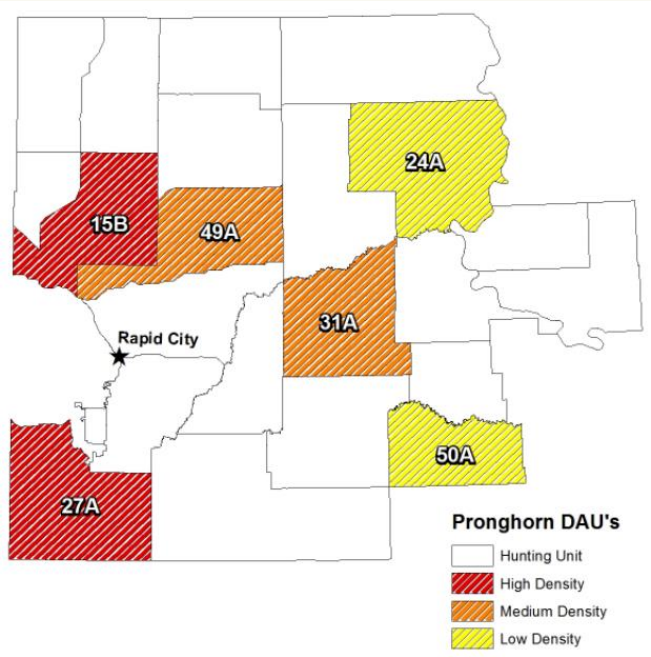
GAME, FISH and PARKS

Deer Research

An evaluation of fall herd composition surveys for deer and pronghorn in South Dakota (SDSU – Dr. Jenks and MS student Kris Cudmore).

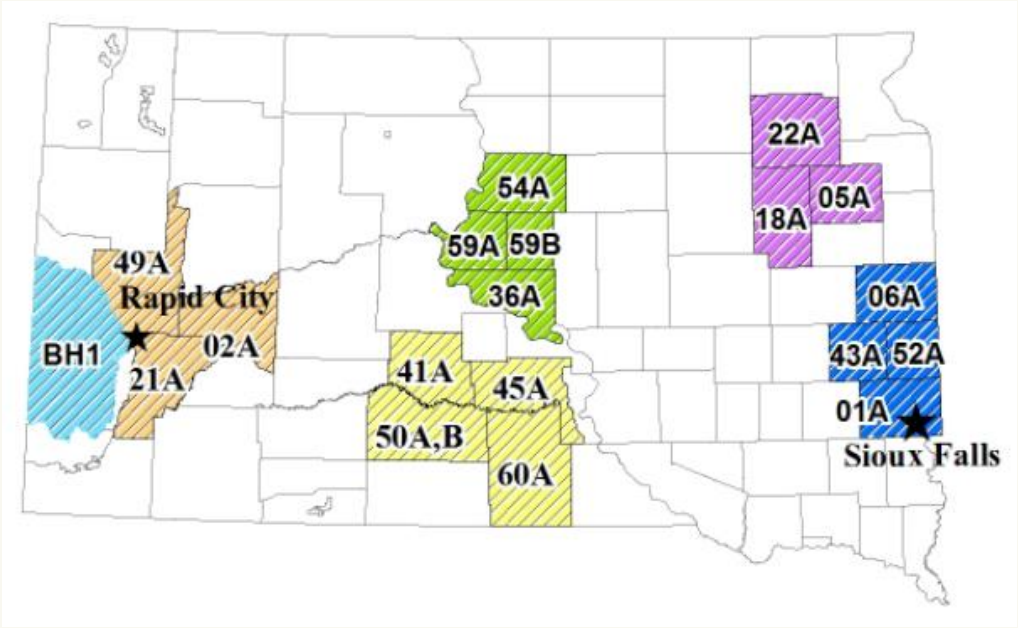
Objectives (July 2017):

1. *Determine minimum sample size for deer and pronghorn classification surveys.*
2. *Compare Sept. and Oct. (deer) and Aug. and Sept. (pronghorn) counts.*
3. *Compare spotlight and daylight counts for deer surveys.*
4. *Assess feasibility of obtaining male:female ratios from deer survey data.*
5. *Evaluate impacts of other survey variations such as a) counting all deer observed vs. only conclusive counts, b) distance from cover, and c) number of observers.*
6. *Develop survey methodology and recommendations.*



Pronghorn Sampling Units

SOUTH DAKOTA
Game, Fish & Parks



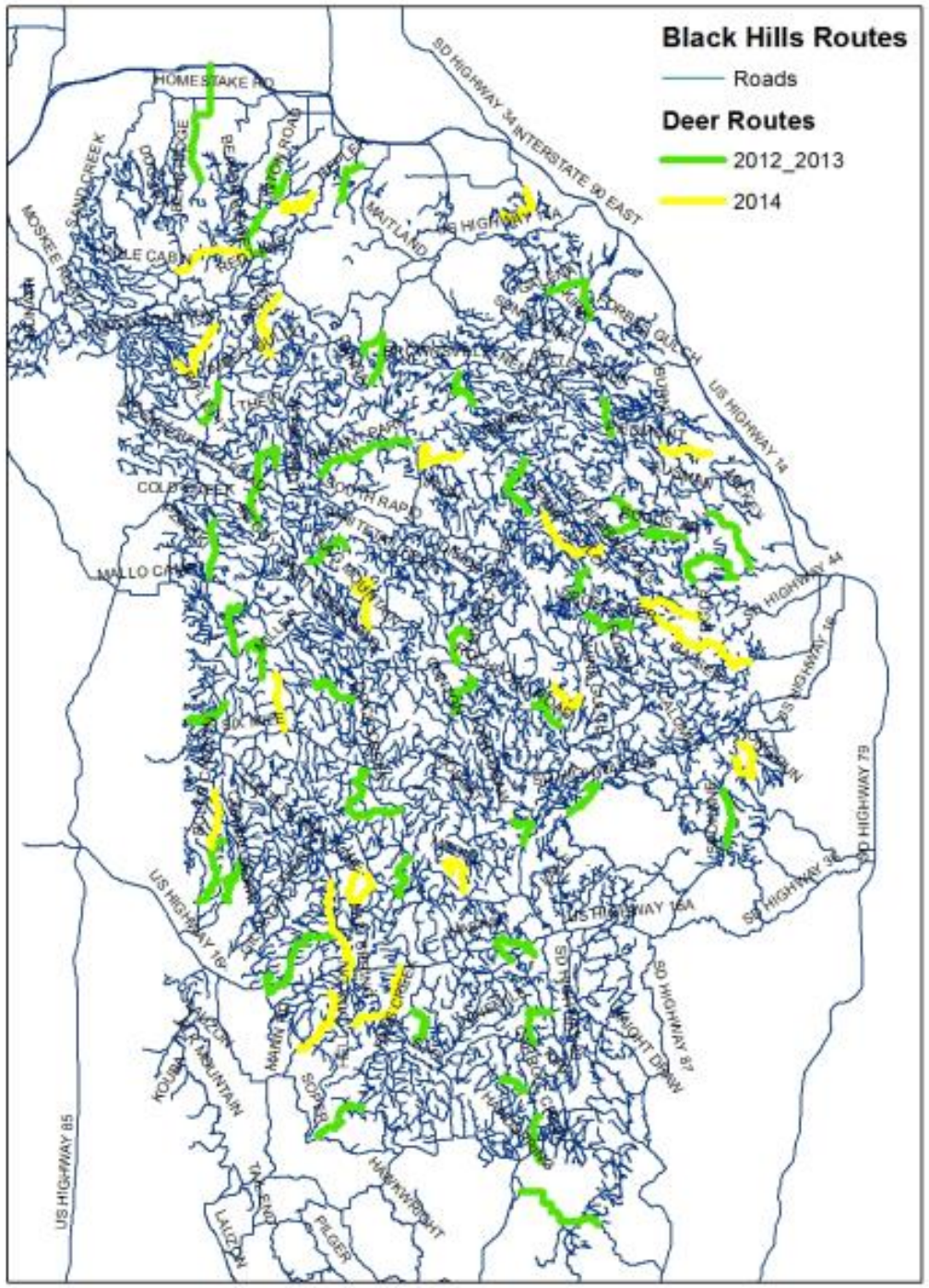
Deer Sampling Units

Deer Research cont.

Estimating population size of deer in the Black Hills
(SDSU – Dr. Jenks and Kris Cudmore).

Objectives (July 2017):

1. *Estimate population size of deer in the Black Hills using general randomized tessellation stratified samples.*
2. *Compare estimates of population size of deer among management units.*
3. *Evaluate factors affecting population size of deer relative to management units.*
4. *Develop population model and survey methodology and recommendations to South Dakota Department of Game, Fish and Parks for implementation in the Black Hills*.



SOUTH DAKOTA
Game, Fish & Parks

Deer Research cont.

An Evaluation of the Impacts of Energy Development on Life History Parameters and Management of White-tailed Deer in the Cedar Creek Anticline of Southwestern North Dakota and Northwestern South Dakota (SDGFP, North Dakota Game and Fish, and 2 SDSU MS graduate students – Bailey Gullikson and Katherine Moratz).

Objectives (Jan 2017):

1. *Determine the impacts of oil and gas energy development on movements survival rates of white-tailed deer in the Cedar Creek Anticline.*
2. *Determine habitat selection and critical deer seasonal habitats and concentration areas in the Cedar Creek Anticline.*
3. *Determine cause-specific mortality factors on radio-collared adults and neonate fawns.*
4. *Determine an annual rate change (λ) for white-tailed deer populations in the Cedar Creek Anticline.*

Captive Deer Research

Dietary Preference and Nutritional Quality of Annual Forages Planted during Late Summer for White-tailed Deer in Eastern South Dakota (SDSU – Dr. Jenks and MS student Troy Wieberg). Expected Completion Summer 2016

- Determine nutritional characteristics and dietary preference of purple top turnips, winter rye, Austrian winter pea, Chicory, Daikon radish, and Crimson clover by captive white-tailed deer.
- Harvest and depredation management implications

Effects of Neonicotinoid Insecticides on Physiology and Reproductive Characteristics of Captive White-Tailed Deer (SDSU – Dr. Jenks, Dr. Grovenburg, and MS student Elise Hughes Berheim). Completion July 2018

Deer Research cont.

The development of a SQL Server database and R software package to model deer populations in South Dakota (UM – Dr. Lukacs and Josh Nowak).

Objectives (December 2015):

1. *Compile, evaluate, and analyze deer population data needed for population modeling.*
2. *Develop SQL database for all applicable deer population data.*
3. *Design appropriate level deer "data analyses units".*
4. *Develop Program R population model and user-friendly interface.*
5. *Complete cost: benefit analyses for additional deer data inputs.*

In-house Research

Deer Survival Research

Common Objectives:

1. Quantify annual and over-winter survival rates of fawn, juvenile, and adult female mule deer and white-tailed deer.
2. Quantify annual and over-winter survival rates of adult male white-tailed deer.
   - Assess marking techniques for male deer
3. Measure pregnancy and fetal rates of yearling and adult female deer.
4. Evaluate and compare annual recruitment estimates using fall herd composition and reproduction/fawn survival datasets.
5. Quantify and evaluate relationships between severe weather (winter and drought severity) and deer nutritional condition, survival, and reproduction/recruitment.
6. Update SDGFP models to estimate deer populations, projections, and growth rates (λ).

Weather

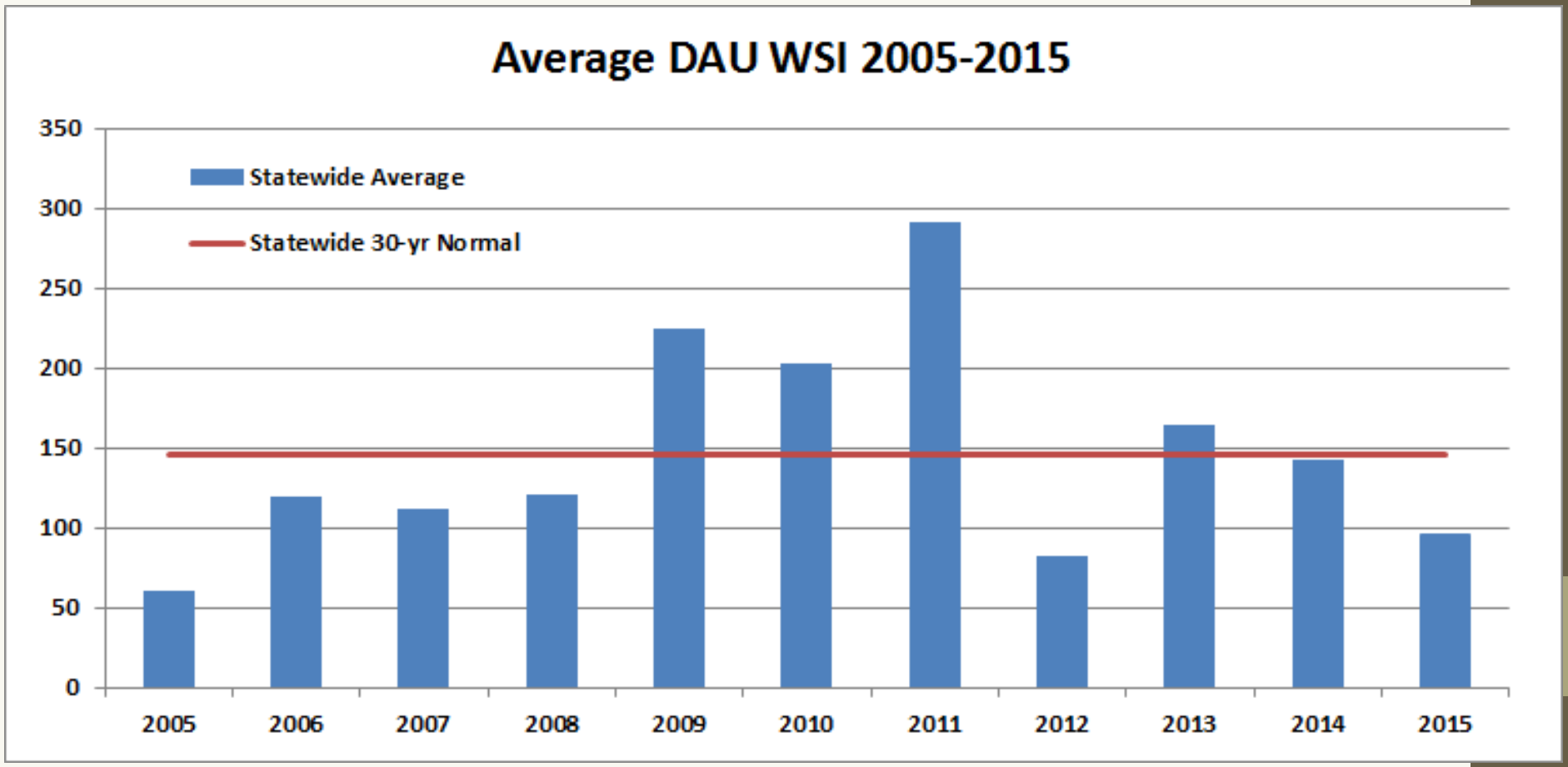
Weather impacts

- Severe winters
- Drought

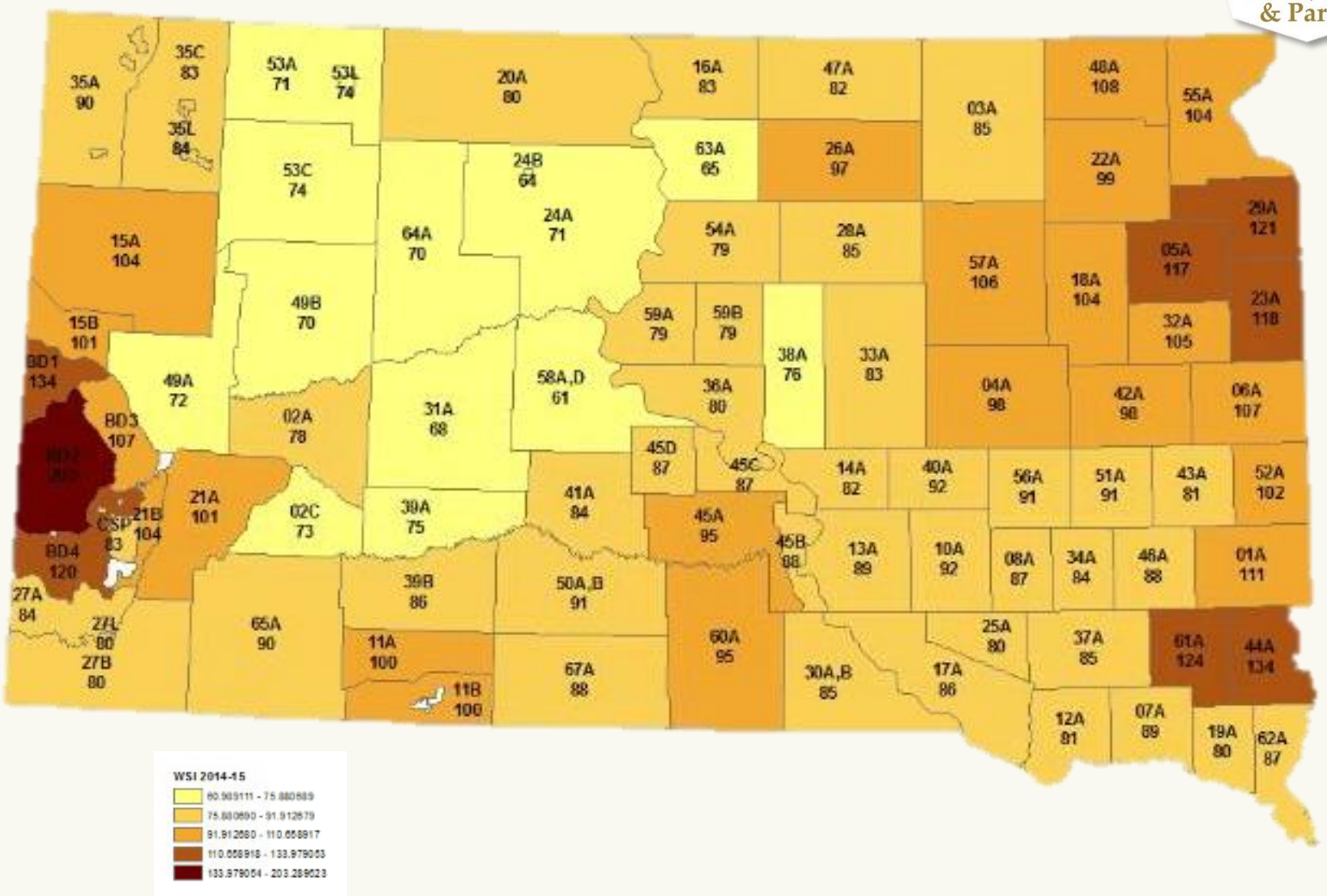
Winter Severity Index (WSI)

- WSI quantified from November 1 – April 30
- Using monthly snowfall and mean monthly air temperatures
  - (-0.1* Temp+1)* Snow Fall= Monthly WSI
- Sum the 6 monthly WSI values to get accumulative WSI value
- For example, lower WSI values represent milder winters with less snow fall and/or milder temperatures

Statewide WSI

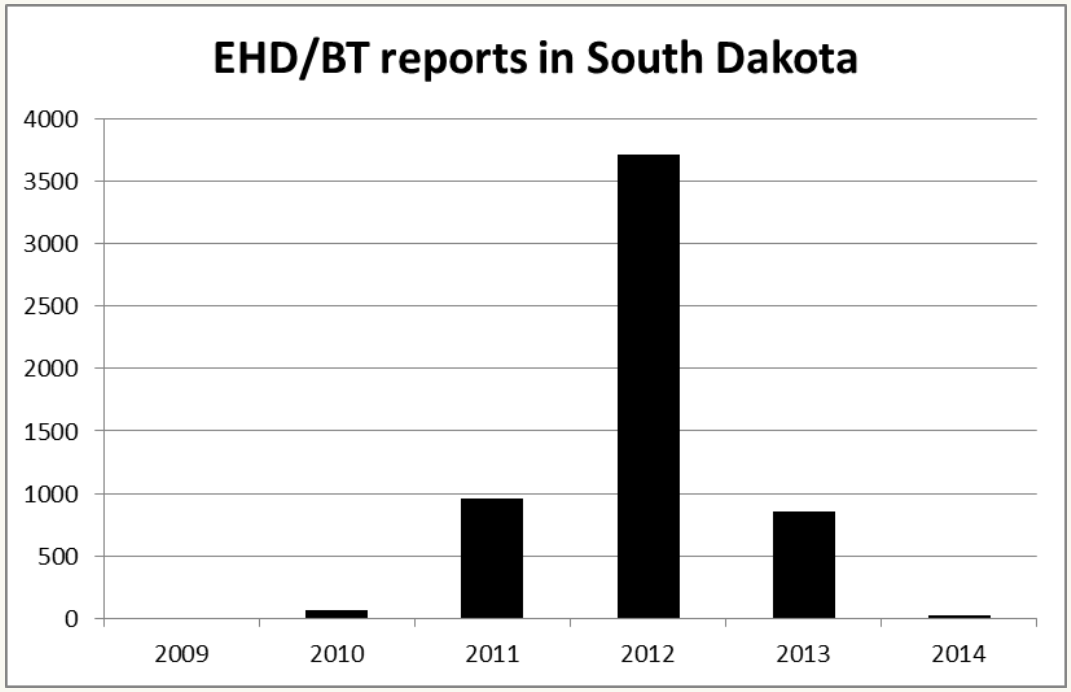


Unit WSI 2014/15

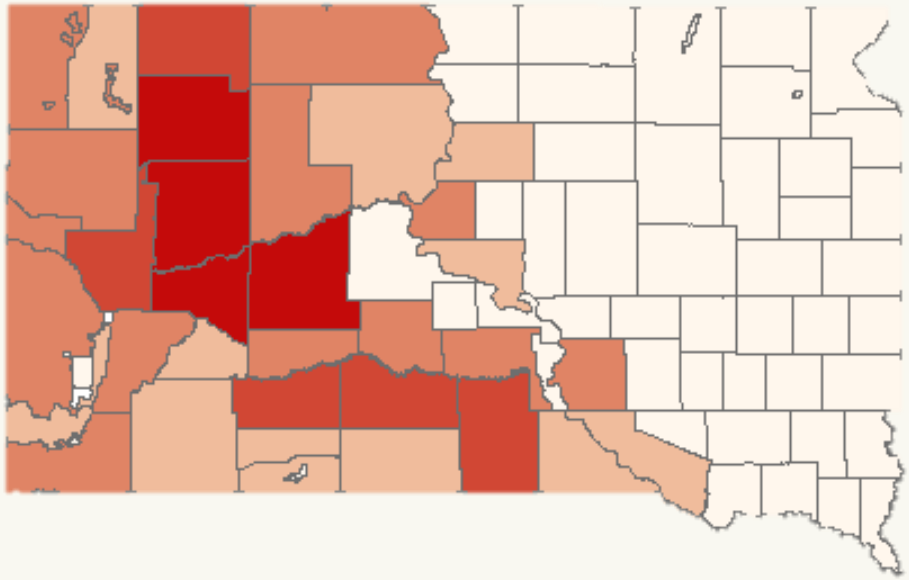


Deer Disease

- Chronic Wasting Disease (CWD)
- Epizootic Hemorrhagic Disease (EHD)
  - 21 unconfirmed reports in 2014



Impacts of Harvest



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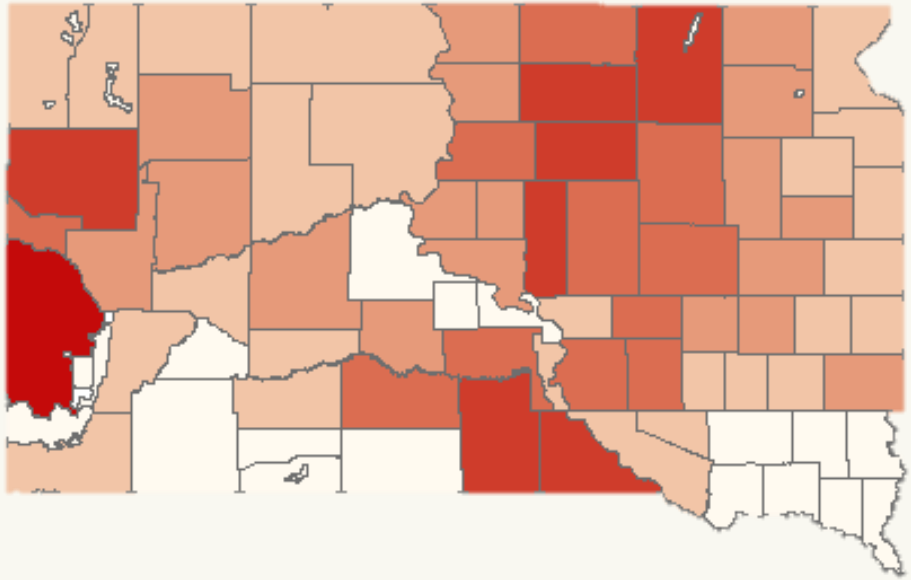
87 - 151
152 - 261



Total Harvest – White-tailed Deer

6 - 104
105 - 236
237 - 428
429 - 703
704 - 1373
1374 - 2351

Deer Survival Project Areas

- 2015 Adult Monitoring
  - Mule Deer – Black Hills, Badlands, Sully, Meade/Pennington
  - Whitetails – Black Hills, Lake/McCook, Clark, Brown, Perkins

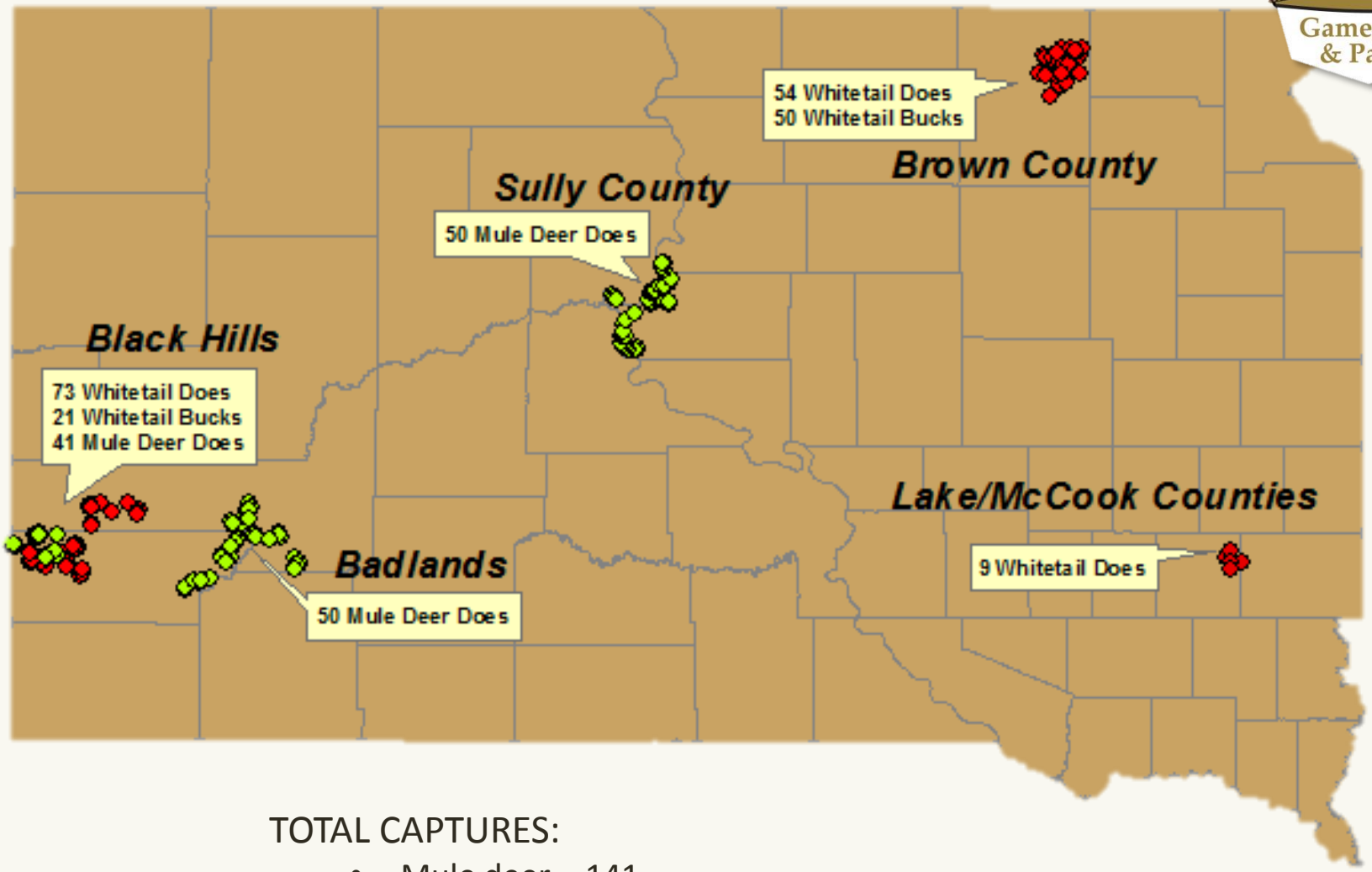
- 2015 Fawn Monitoring
  - Mule Deer – Black Hills, Badlands, Sully
  - Whitetails – Black Hills, FPNG, Lake/McCook, Brown

Adult Capture Methods

- Heli-capture or walk-in baited net traps
- Adults/yearlings and juveniles

- Processing Site
  - Hobbled, blind-folded, mild sedative
  - Sex and age
  - Draw blood – pregnancy test and thyroxine testing
  - Monitor temperature and respiration
  - Ultrasound
  - Collar
  - Antibiotic
  - Neck measurements - bucks

2015 Adult Deer Captures

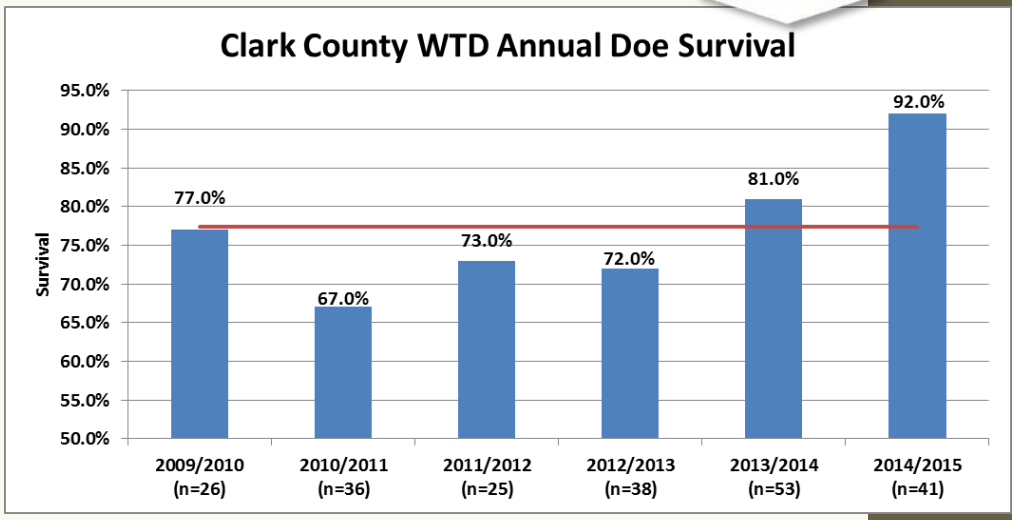


TOTAL CAPTURES:

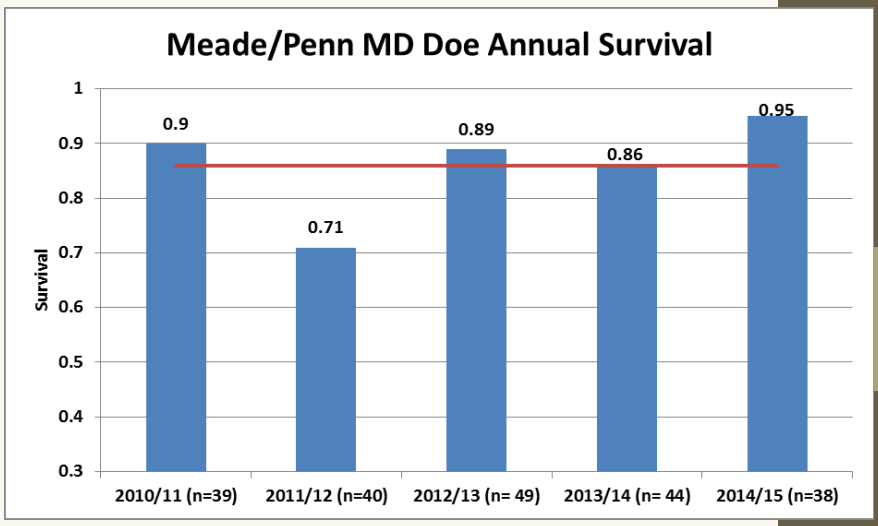
- Mule deer = 141
- Whitetails = 207

2014/15 Adult Annual Survival

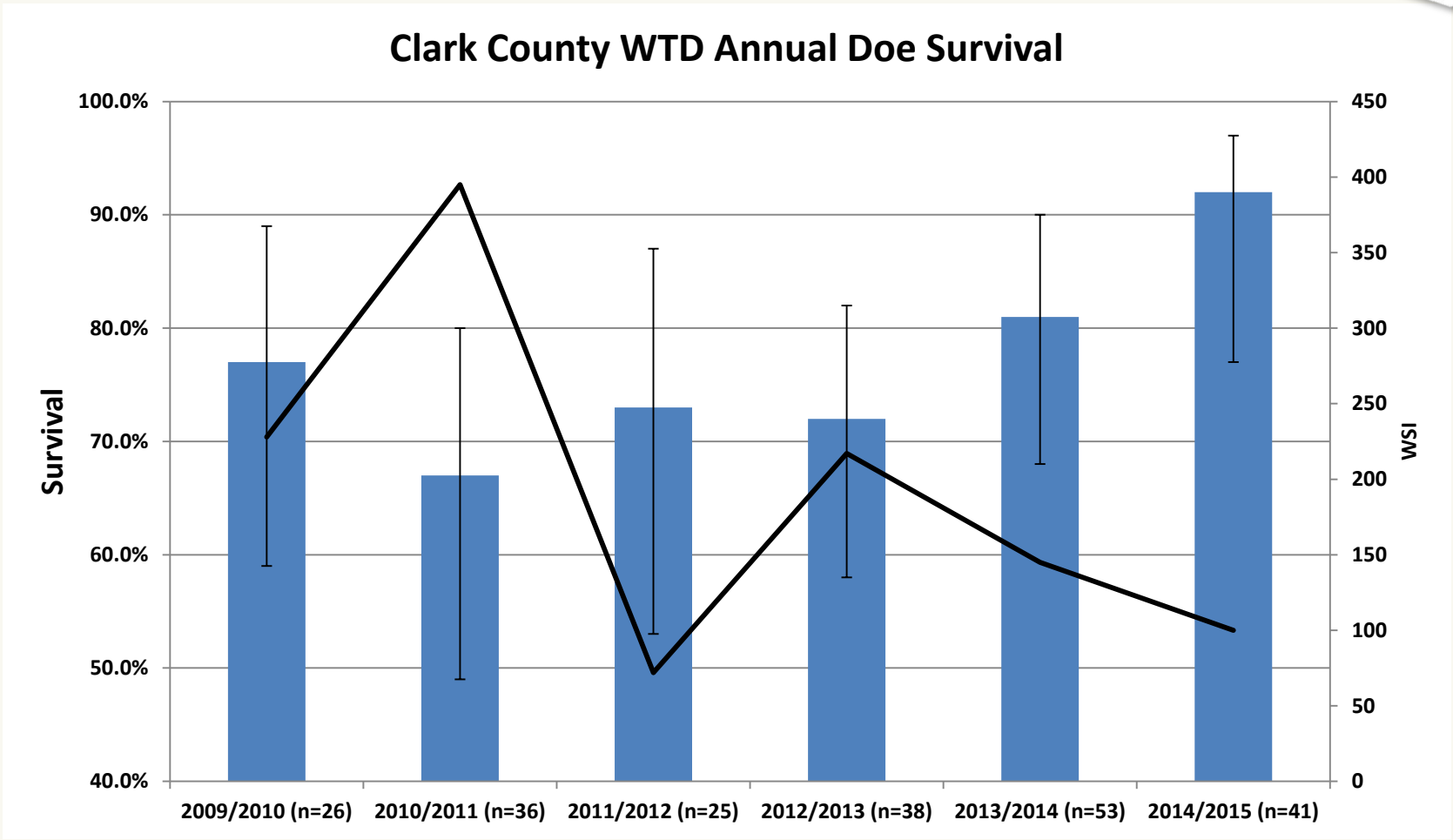
- Whitetail Doe Survival
  - Clark – 92% (77-97)
  - Lake/McCook – 78% (64-88)
  - Perkins (SDSU) – 98% (87-100)



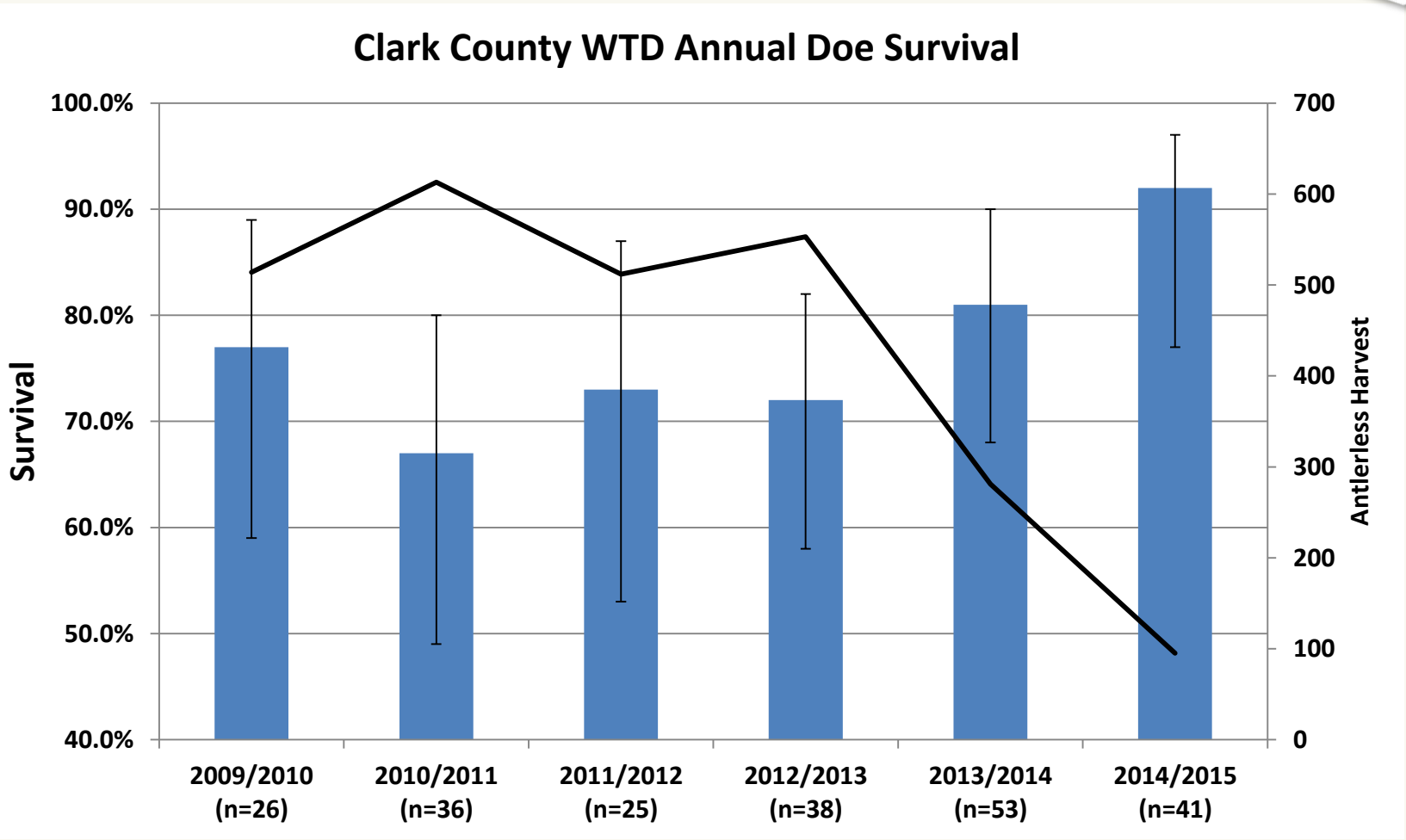
- Mule Deer Doe Survival
  - Meade/Pennington – 95% (81-99)



Adult Female WTD Survival and WSI



Adult Female WTD Survival and Harvest

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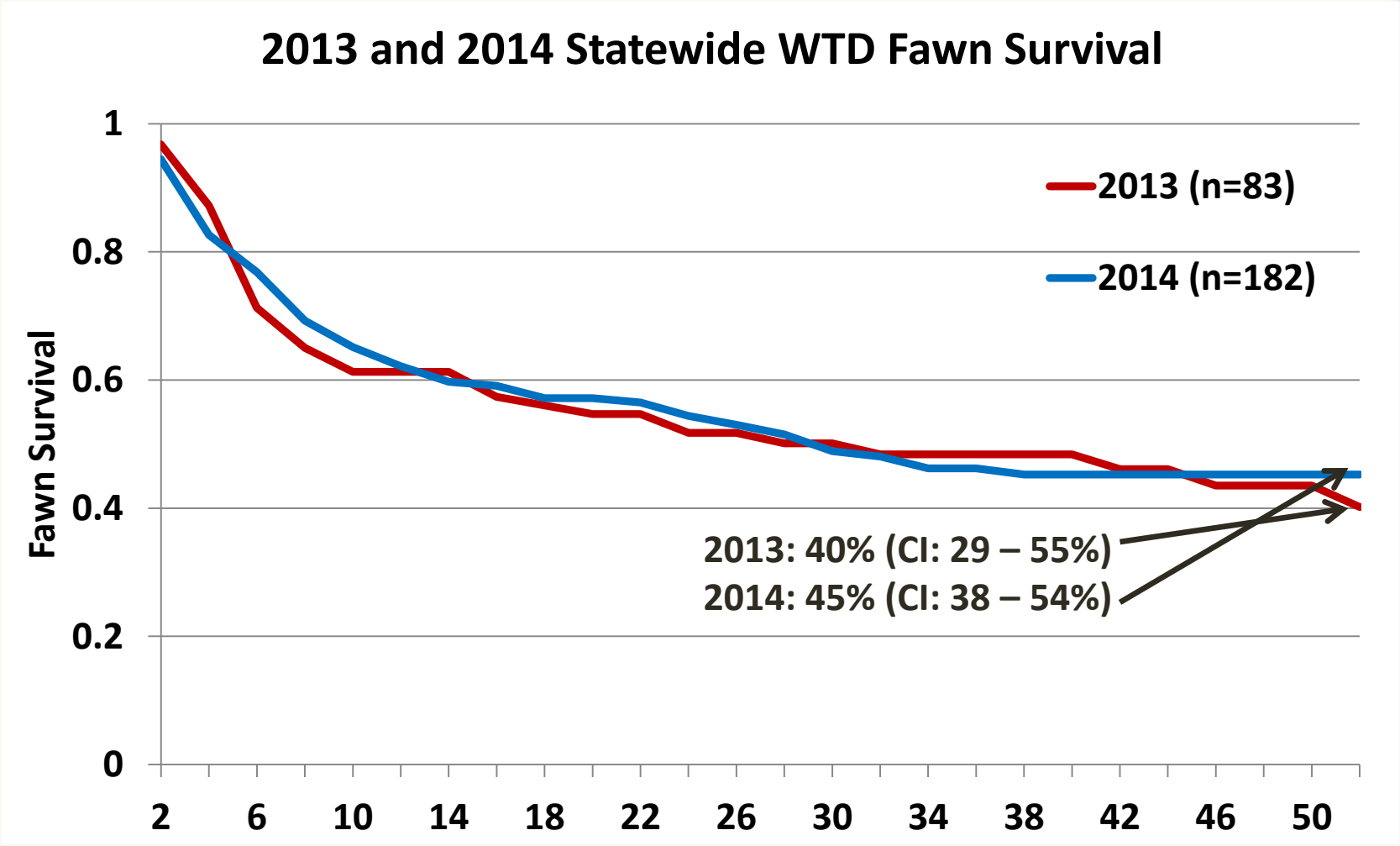
Fawn Captures

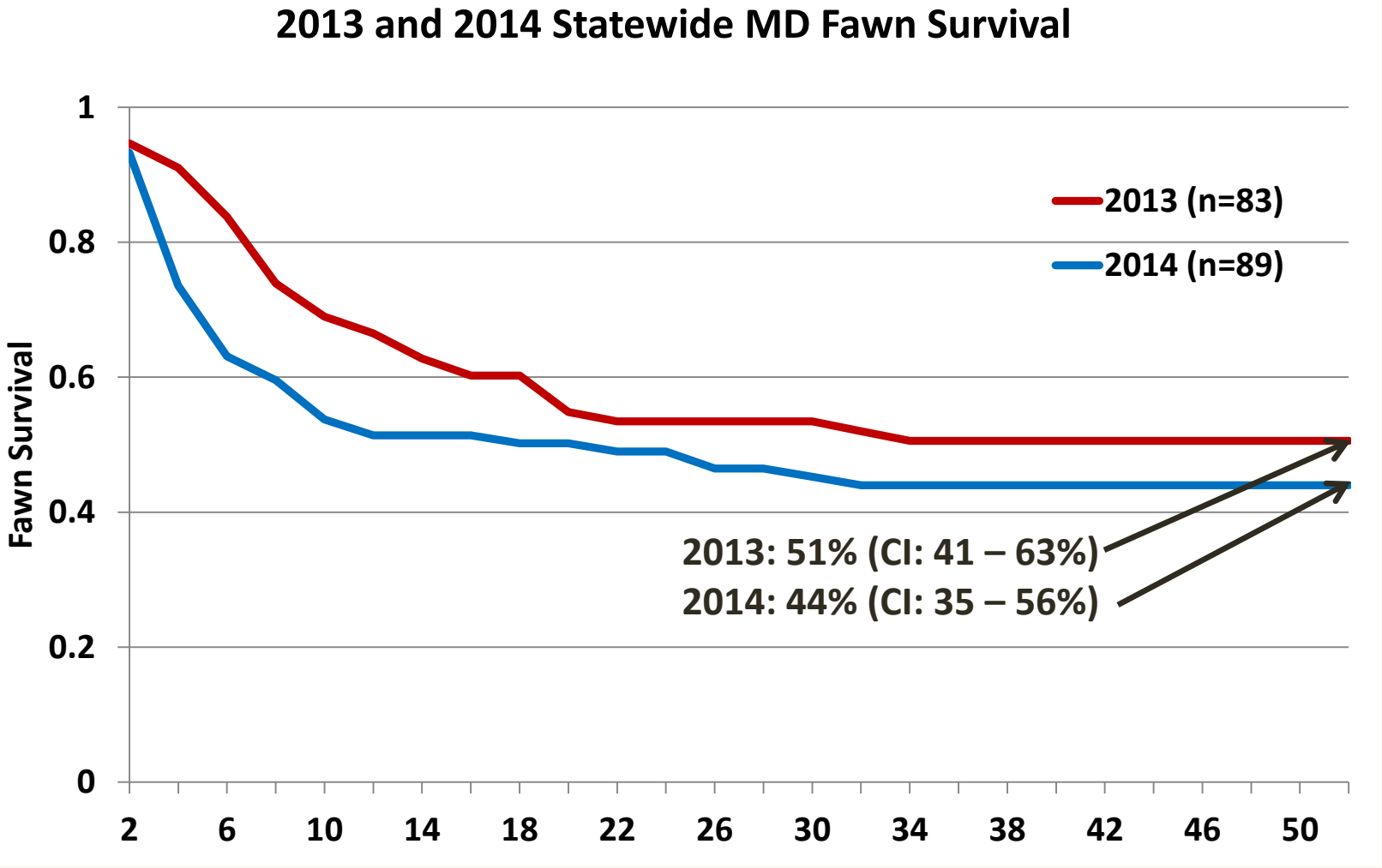
- **Methods**
  - Daytime ground searches and opportunistic visual observations.
  - Attached VHF expandable radio-collar
  - Sex and weight (lbs)
  - Estimated age in days (umbilical cord, weight, mobility)

- **2015**
  - 389 fawns were captured and collared
    - 148 Mule Deer
    - 241 Whitetails

White-tailed Deer Fawn Survival



Mule Deer Fawn Survival

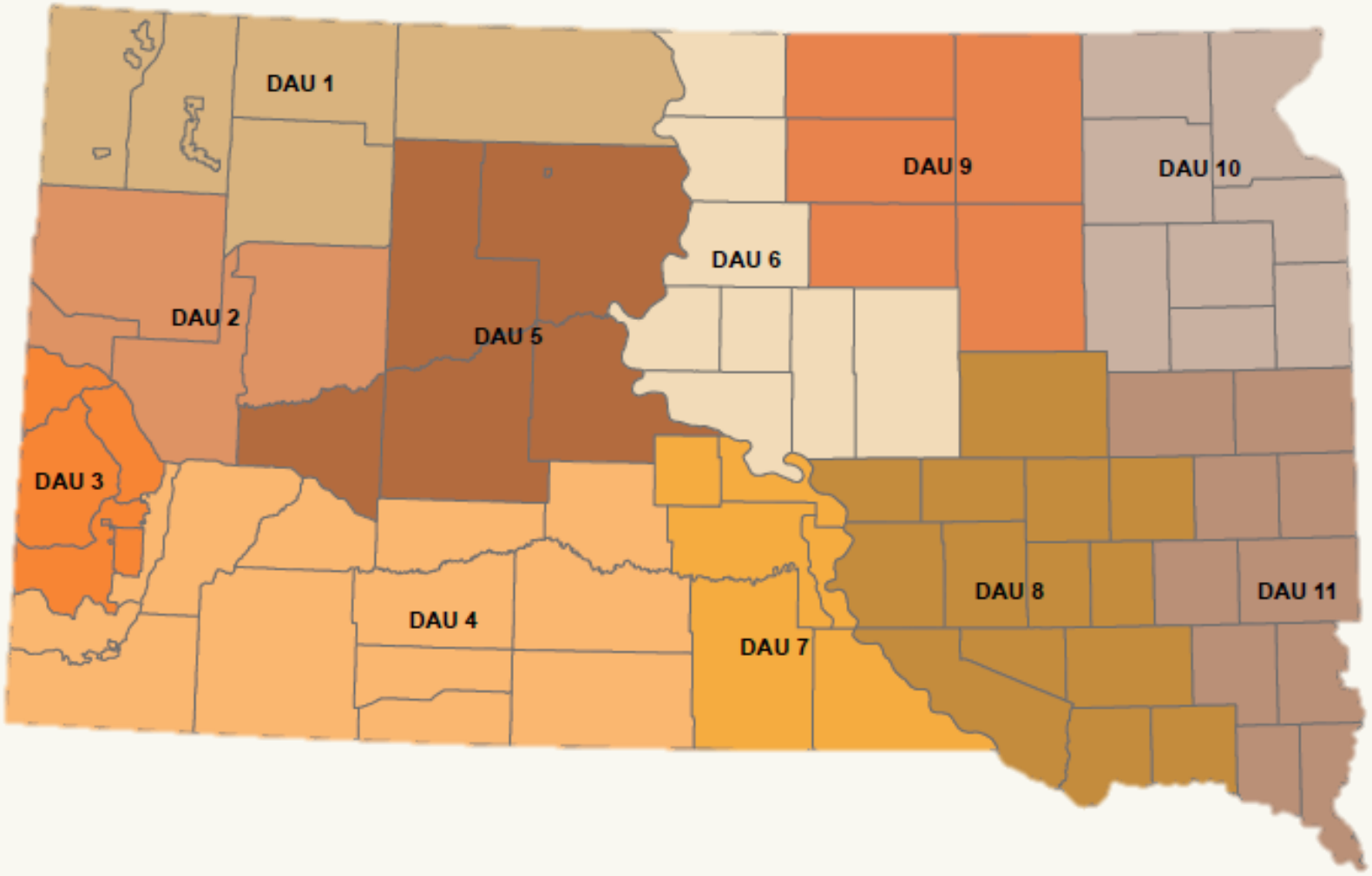


2016 Deer Survival Monitoring Plans

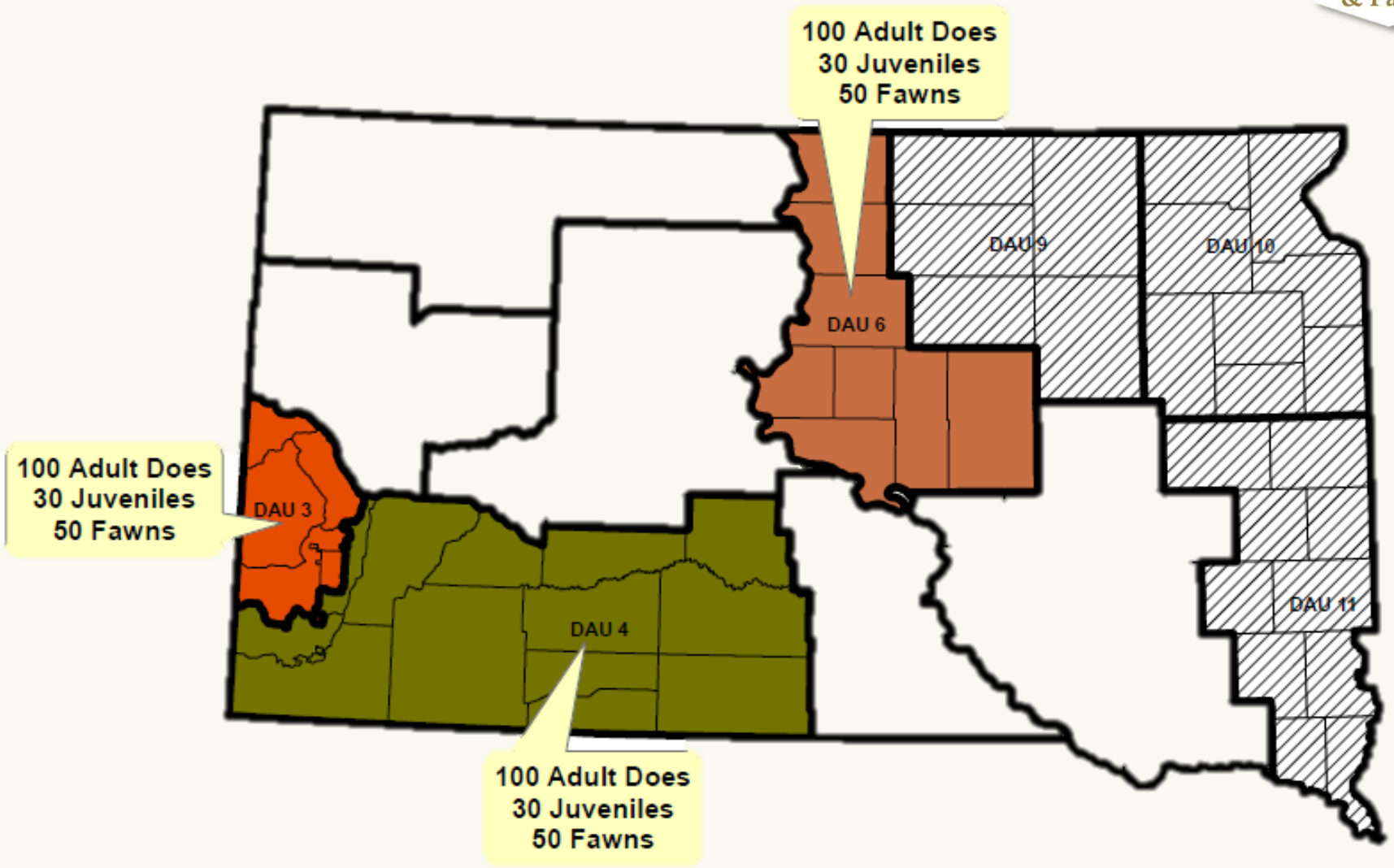
Study Area	Species		Plan to Deploy	Currently Alive	Total
Black Hills	WTD	Doe	49	56	105
	WTD	Juv	30	27	57
	WTD	Buck	20	14	34
	WTD	Fawn	50	-	50
	MD	Doe	74	31	105
	MD	Juv	29	25	54
	MD	Fawn	50	-	50
Badlands	MD	Doe	57	48	105
	MD	Juv	31	29	60
	MD	Fawn	50	-	50
Perkins	WTD	Doe	0	43	43
	WTD	Juv	0	22	22
Missouri River	MD	Doe	59	46	105
	MD	Juv	30	21	51
	MD	Fawn	50	-	50
Lake	WTD	Doe	71	32	103
	WTD	Juv	30	25	55
	WTD	Fawn	50	-	50
Brown	WTD	Doe	60	44	104
	WTD	Juv	30	28	58
	WTD	Buck	28	28	56
	WTD	Fawn	50	-	50
TOTAL			848	519	1367

Survival Monitoring Areas

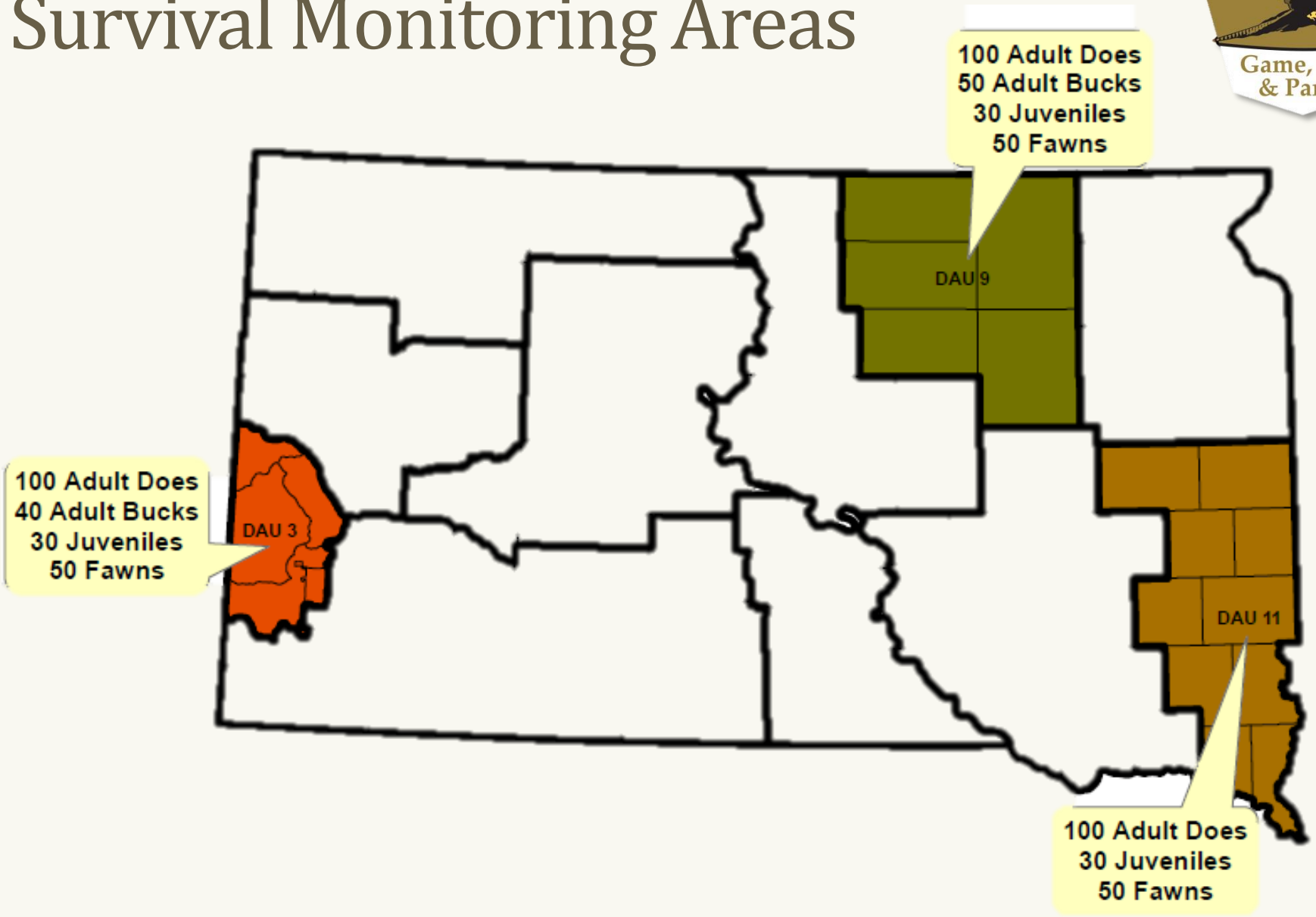
- 11 Data Analysis Units (DAUs)



2016 Mule Deer Survival Monitoring Areas



2016 White-tailed Deer Survival Monitoring Areas



Summary

- Recruitment stable to up
- Low harvest rates
- Harvest success and satisfaction up
- Adult survival up
- Fawn survival quantified
- Mild winter
- Disease loss minimal

= population growth

At the next stakeholder meeting we will go over population models in detail


South Dakota
Wildlife Division
Department of Game, Fish and Parks
QUESTIONS?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